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MECHANIX ILLUSTRATED[©]

THE HOW-TO-DO MAGAZINE

NEW

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JULY



CAN GUIDED MISSILES
SAVE US FROM
A-BOMB HAVOC?

See Page 76

CAL SMITH

USE AMAZING NEW ROCKET ^{Main}FUEL TO MAKE YOUR GARDEN GROW
BUILD AN ATTIC FAN TO COOL YOUR HOME

MECHANIX ILLUSTRATED

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COVER BY CAL SMITH

MI

JULY 1954

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MEMBER AUDIT BUREAU OF CIRCULATIONS

How You Can Spot A Suitcase A-Bomb

Don't bury your head in the sand. Learn the secrets of the saboteurs and help to protect your country.

By Frank Tinsley



This story has been read and its contents endorsed by Martin Caidin, Atomic Warfare Specialist for the New York State Civil Defense Commission and one of the nation's leading authorities on atomic bombing. "Mr. Tinsley is to be congratulated for this public message." Mr. Caidin states. "The public has good cause to heed carefully this data which may one day save their lives."

BABY A-BOMBS, small enough to be carried in a suitcase and set off by self-contained timers, are a real and immediate danger to the safety of our country!

This is the gist of a warning that has been quietly circulated by the F.B.I. to law enforcement agencies throughout the United States. The details of this menace have been played down in many newspapers and magazines for fear of starting a public panic. Remembering the hysterical reaction to Orson Welles' famous broadcast of an imaginary Martian invasion, officialdom seems to think that the American people just can't take it. They point to the wave of H-bomb hysteria that has swept the world and have decided that if ignorance isn't bliss, it is at least the next best thing to it!

Your editors can not subscribe to this head-in-the-sand theory. Rather, we agree with Dr. James Beckerley of the Atomic Energy Commission, who said, "An ostrich-like attitude about atomic information

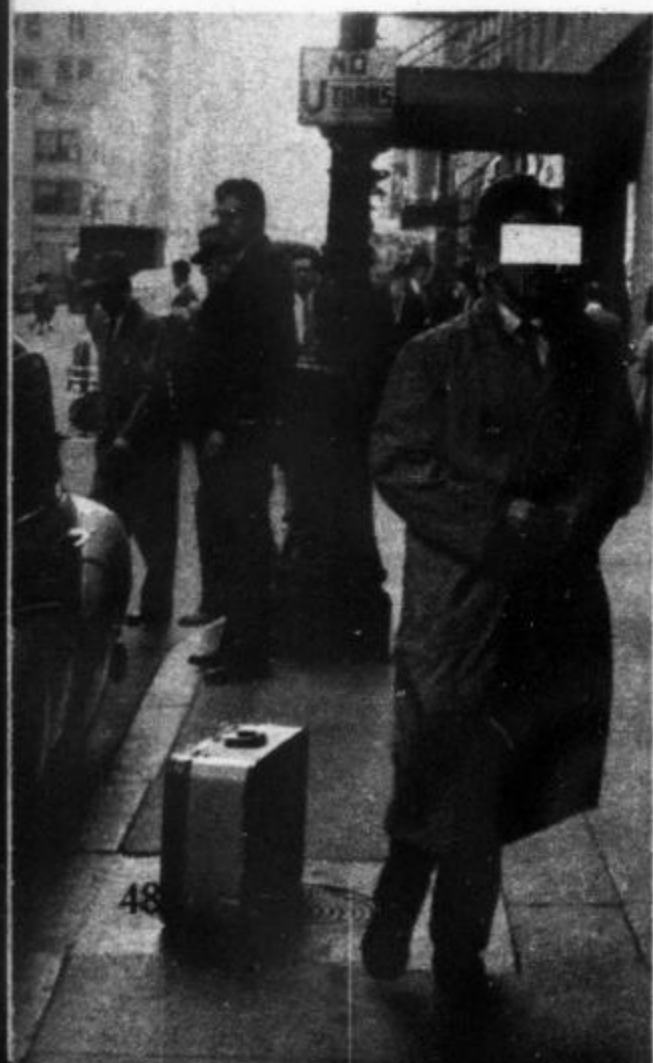
could lead to catastrophe!" We in MI feel that Americans can "take it" and that the hazards of A-bomb sabotage can be materially lessened by putting an aroused public on its guard. We believe in the old saying: "Learning to recognize your enemy is half the battle." The translation of unknown terrors into identifiable risks is the first step toward a calm, steadfast courage that ultimately conquers them.

Sneak A-bombs pose a truly terrible threat—the stab-in-the-back of Pearl Harbor multiplied a million times. However, like all weapons, they have their limitations. The main ingredient, Plutonium, is neither common nor easy to come by. It must be smuggled past our borders or stolen from well-guarded government plants in this country. The latter is a distinct possibility. Medford Evans, formerly of the A.E.C. and author of "The Secret War For The A-bombs," states that "It is probable that fissionable material has been diverted in quantities sufficient to make as many as 20 atomic bombs." He believes that these already have been made and are ready to be assembled and set off if and when the time comes!

The actual detonating mechanisms present no problem to a saboteur. They can be made in any machine shop with the parts scattered among enough establishments as to be unidentifiable. There must be thousands of small "model making" shops in the country, accustomed to dealing with suspicious and secretive inventors who farm out the making of their precious brain chil-

MI Plants A Suitcase A-Bomb

Attempting to show just how easy it would be for an enemy saboteur to plant a suitcase atom bomb in a vital part of one of our major cities, an MI staff member left an 80-lb. suitcase "bomb" on the street near Grand Central Station, N. Y., for more than 30 minutes.



dren in parts. However, the assembled bomb or its components must be transported and set up in strategic areas and the parts are sufficiently unusual in form and material to be recognized. This is the weak link in the saboteur's chain that we can guard against. It is not a sure or easy defense but universal watchfulness can materially reduce the odds against us. This is the best we can do. It is just another of the "calculated risks" that free men must face.

Who are the self-appointed sentries to mount this vital guard? You are. I am. Everyone can keep an eye peeled—especially those of us who deal with strangers on the move. Taxi drivers have an important function to perform since the least obtrusive way to carry a suitcase or large bundle is by car. So have rent-a-car operators, garage men and service station employees. Baggage checkers and expressmen, porters, doormen, bellhops—anyone who handles strangers' grips, should be on the lookout for luggage or packages that are unusually heavy for their size. Keepers of motels and tourist homes in areas adjacent to defense plants, dams and large power stations should be especially watchful. Several ostensible strangers carrying components could meet at such a motel and assemble a bomb in the privacy of a cabin.

But public places and vehicles present a danger to the saboteur. Hotels and terminals are discreetly watched and taxi drivers are sometimes curious. So a private car is a more likely form of transport and a small office or apartment in a busy section is a more likely hide-out. Renting agents, janitors, elevator operators, charwomen and service personnel should be on the alert

in such buildings. Keep an eye out for odd-shaped machine parts, visitors arriving with small, weighty bundles. Study the shapes of typical A-bomb components shown in the accompanying illustrations. However camouflaged, these forms are basic.

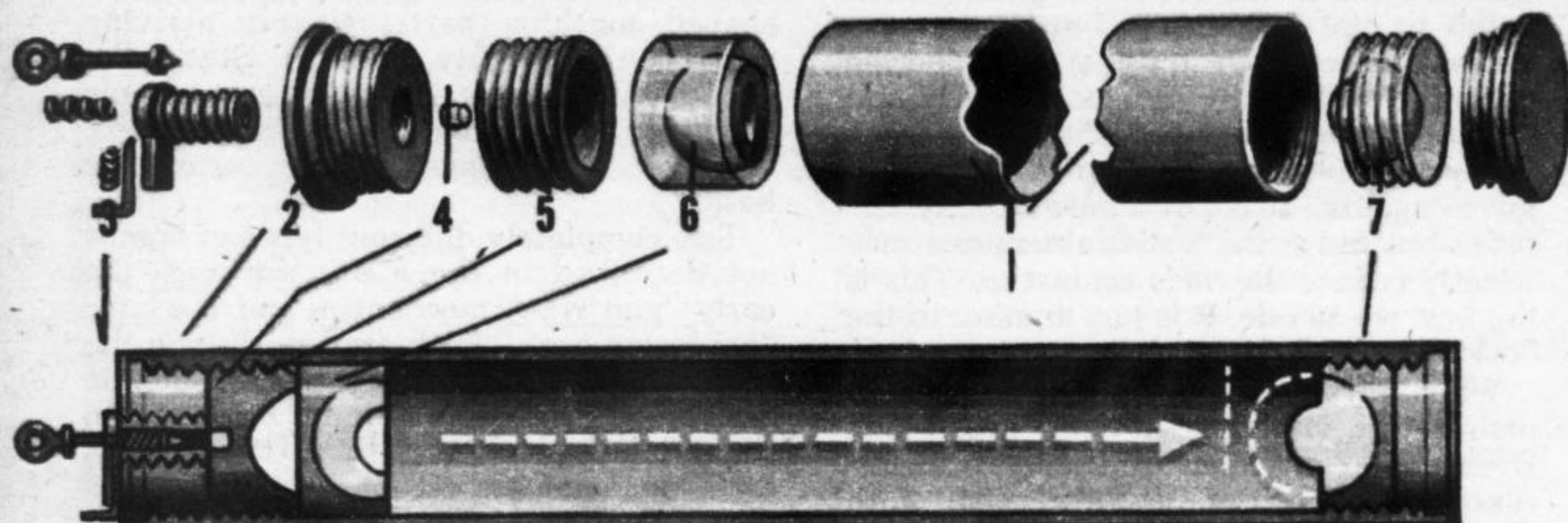
Two completely different types of bombs are described in the F.B.I. warning—the early "gun type" mechanism and the later "implosion type." Both are based upon the "critical mass" characteristics of atomic fission. All Plutonium radiates neutrons. In small lumps, however, these tiny, atom-cracking hammers escape harmlessly into the surrounding atmosphere. It is only when the lump becomes large enough to contain its neutrons and put them to work splitting adjoining atomic nuclei that an explosive chain reaction begins. This critical mass is about the size of a softball or grapefruit and weighs approximately 50 lbs. In any atom bomb it is divided into two or more segments which are brought forcibly together to cause the explosion.

The gun type of bomb is very simple. It consists of a gun-barrel-like tube containing a hemisphere of Plutonium at either end. One of these is fixed in place. The other is movable and is backed by a propulsive charge of high explosive such as TNT. When the TNT is set off by a mechanical trigger or electric primer, it blows the movable lump of Plutonium violently against the fixed segment. Together they are large enough to form a critical mass and an explosion follows. To assure complete joining, one hemisphere is usually hollowed out to receive a projecting stud on the other. Sometimes a complicated surface of intermeshing "dovetails" is used. For ac-

Convinced that he was "safe" on the street, our man next tried to look suspicious inside station.

Finally he got a porter to plant the suitcase in a locker. Soldier at right never turned around.





Schematic diagram of the gun type A-bomb and its component parts. In this earlier form of bomb mechanism two segments of Plutonium are shot together, forming a single mass of fissionable size. This is the type of bomb that is most easily concealed in a suitcase.

1. Gun-barrel-like casing, internally threaded at either end. It must be made of steel strong enough to contain propulsive pressures.
2. Screwed-in cap closes breech end of tube and contains the firing mechanism.
3. Trigger, firing pin, springs and housing.
4. Primer is set in base of propulsive charge.
5. High explosive shaped charge, screwed into breech, propels movable Plutonium.
6. Movable segment of Plutonium, encased in a plastic "bullet," is driven through the tube to join its fixed, sister segment.
7. Fixed segment of Plutonium is encased in a threaded plastic plug and screwed into the muzzle end of tube. Male and female joints assure complete fission.
8. Muzzle cap closes end of tube, acts as anvil for Plutonium fusion.

With one "bomb" planted, attention was turned to the tunnel under First Ave. near the U. N. building. Despite warning sign our "spy" was ignored.

Then it was on to the George Washington Bridge. Suitcase placed under bridge support was noticed but untouched by passersby, two police officers.



curate positioning both are sunk into round, plastic or metal plugs which fit the inside of the tube. The female segment is threaded into the bore and is backed by a screwed-in anvil cap. The male segment is a squeeze fit and functions like a bullet in a smooth-bore musket barrel.

The implosion type of A-bomb is based upon the same theory but it is a bit more complicated to build. It is spherical in form and somewhere between 20 in. and two ft. in diameter. Basically the bomb consists of some 36 rounded segments of high explosive, shaped to fit together like the keystones of an arch to form a hollow ball. Each segment or "lens" is roughly analogous to the "shaped charge" of a bazooka shell, being scooped out on its inner face to focus the force of an explosion inward. Hence, the term "implosion."

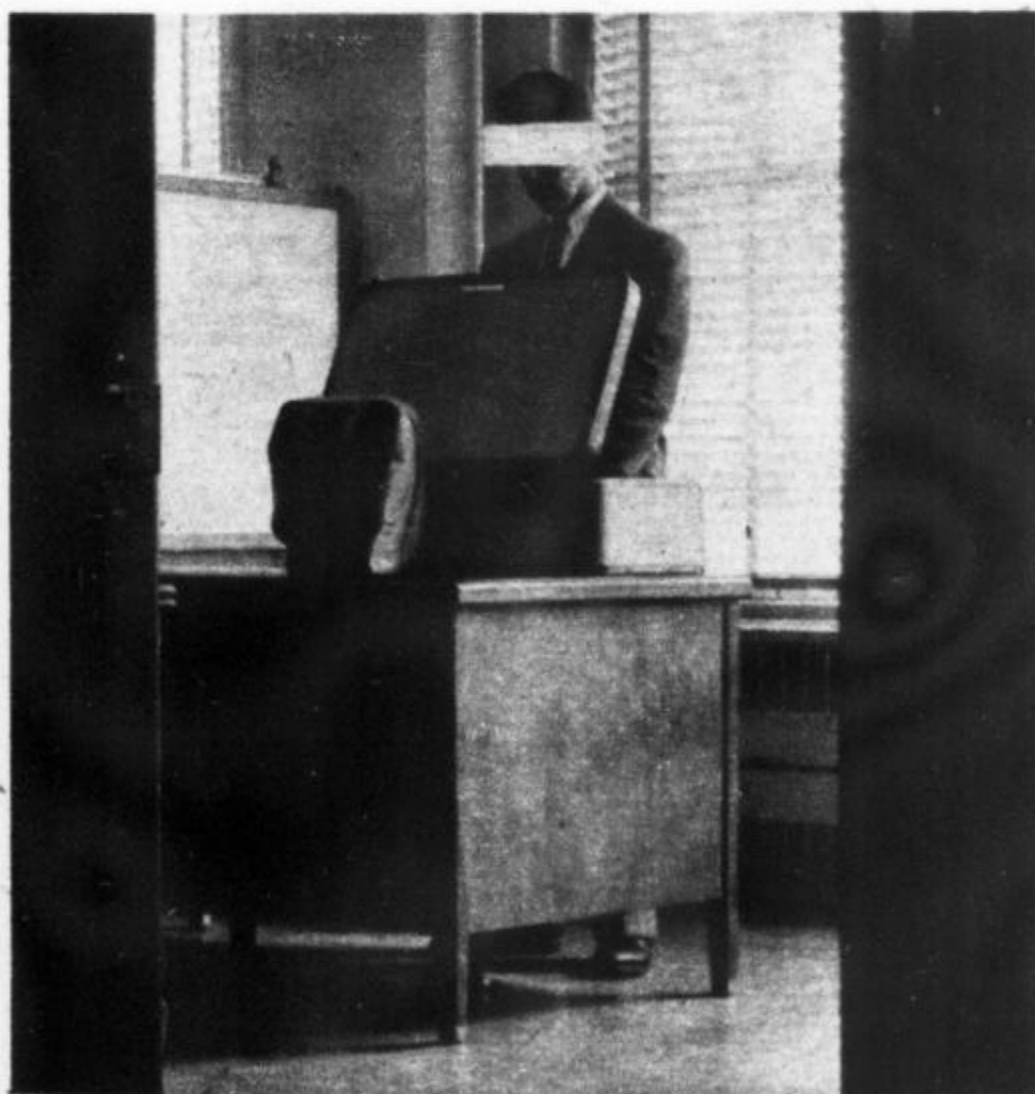
Attached to the inner face of each lens, directly over the hollow, is a four-sided, wedge-shaped piece of Plutonium. When the lenses are exploded simultaneously, these wedges are driven inward to combine in a mass of critical size. Some bombs include a small central ball of Beryllium—Radium or some other supplementary neutron source which hops up the chain reaction. In a slightly simpler form of implosion bomb the Plutonium is in the form of a highly porous sphere with a hollow

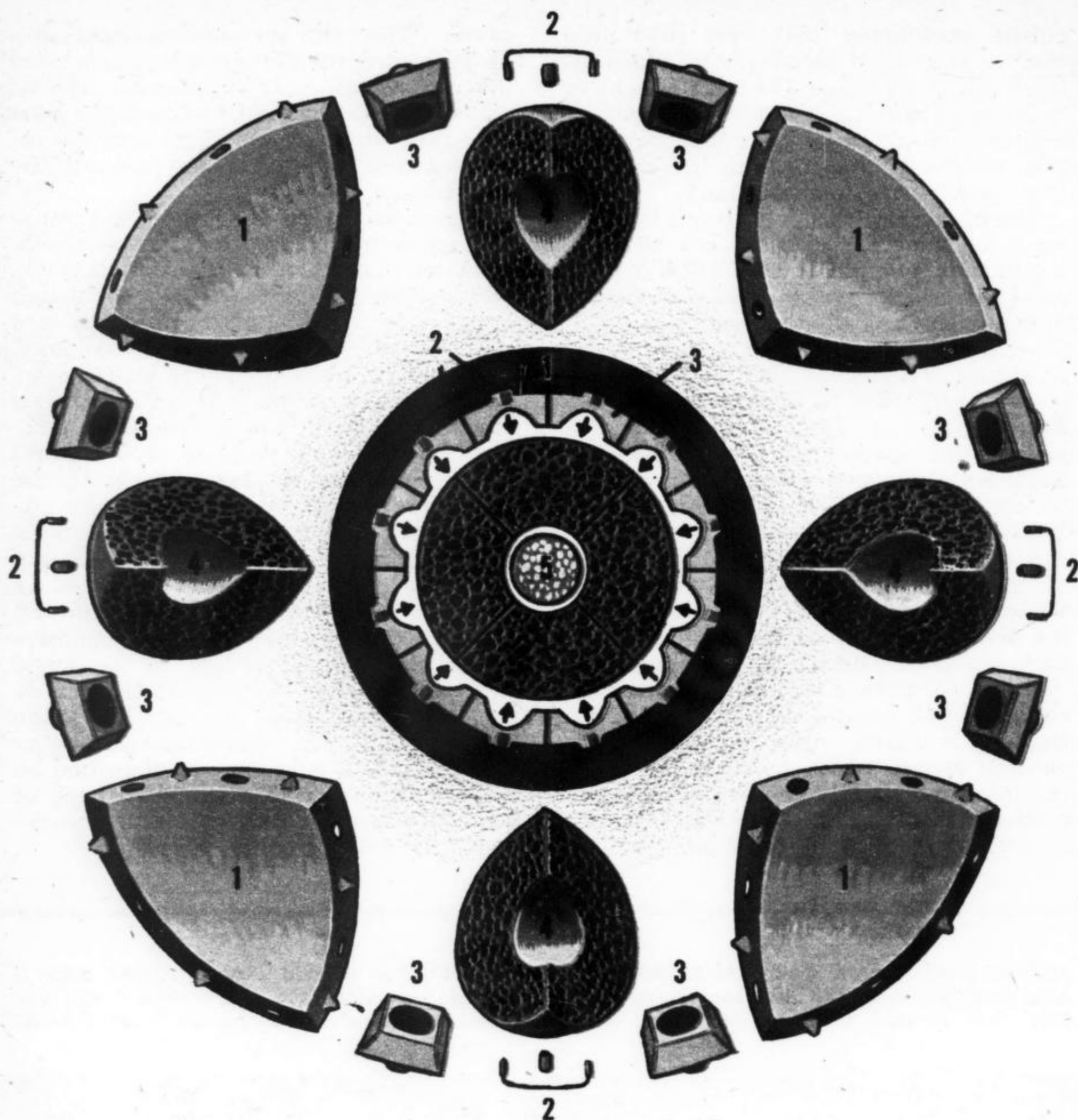
center. When the surrounding lenses explode inward, the Plutonium is compressed into a critical mass of normal density. Again, a center ball of Beryllium—Radium expedites the blow-off. Parts and assemblies of both these types are shown in the illustrations.

Due to the danger of handling and transporting, A-bombs are almost never finally assembled until just before using. It is important, therefore, to learn the basic shapes of all these components. Plutonium is a silvery gray, metallic substance, "slippery" feeling and heavier than even lead or gold. TNT is comparatively soft, a dirty yellow in color and has a "soapy" feel. Do not expect to find bomb parts in their natural form, however, as they can easily be disguised, both in shape and surface appearance. They can be buried in innocent-looking machine parts, moulded into blocks of opaque plastics, or plated to change colors, textures, etc. Nevertheless the basic shapes of the high explosive lenses, Plutonium wedges or sectioned spheres must be in there somewhere, easily removable and ready for assembly. One point to remember: Plutonium can be so shielded that it is immune to detection by a Geiger Counter. The simple passing of such devices over a suspected case or package is not conclusive!

Back in a sparsely-furnished midtown office, the components are assembled into a bomb by our man. This could be done in almost any office, hotel.

Bomb can be planted right in rented office if building is close to target. Bowling ball disguises explosive core in another type of bomb.





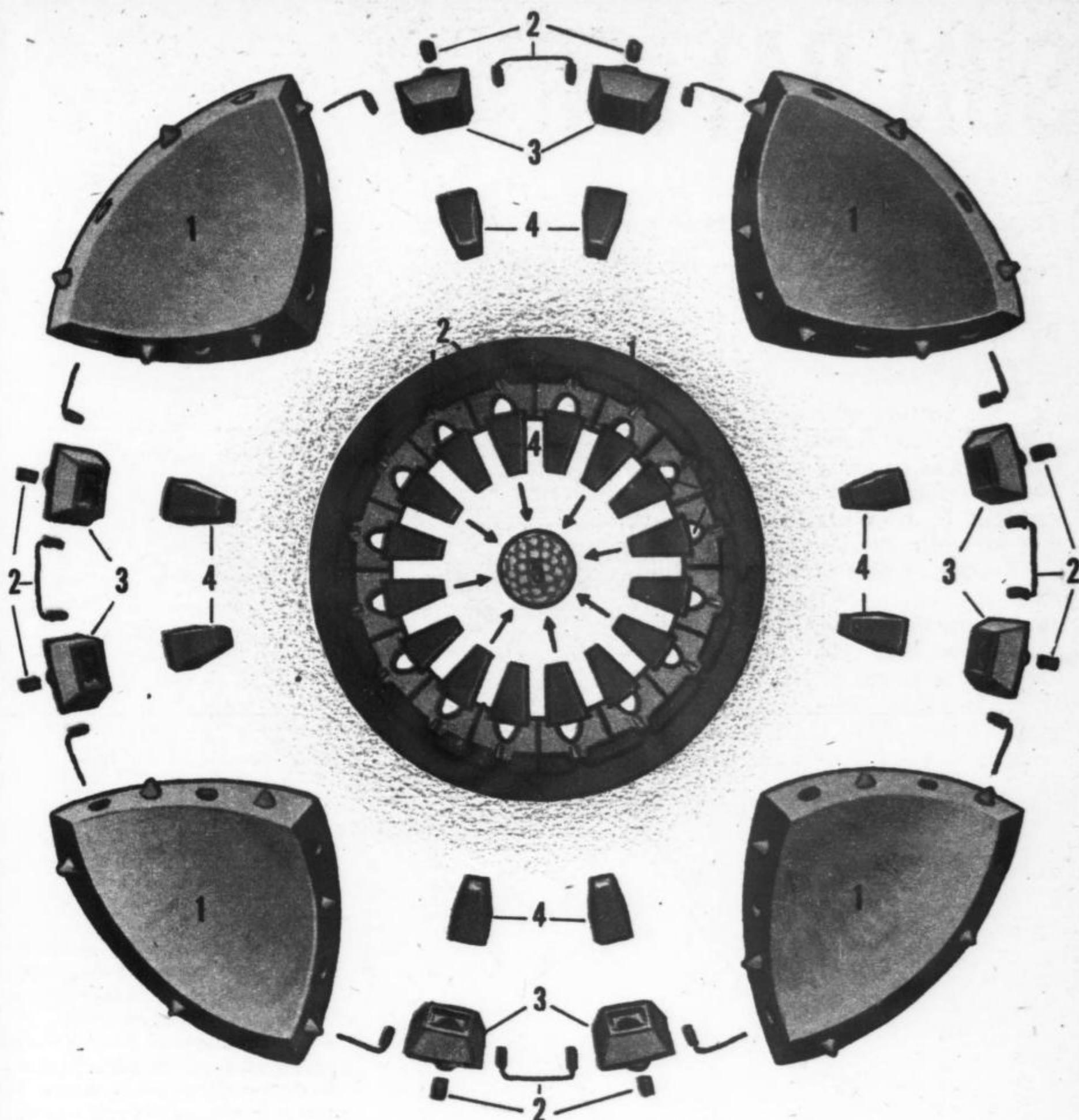
Here is the schematic diagram and component parts of an "implosion" type of bomb. Inward force of the high explosive "lens" compresses a sphere of Plutonium around a central source of supplementary neutrons. The result is a critical mass that erupts into a chain reaction.

KEY

1. Plastic casing. This may be divided into two or more pieces for easy carriage.
2. Wiring links and primers for detonation.
3. High explosive "lens" directs the force of the explosion inward.
4. Hollow sphere of spongy Plutonium, which may be divided into segments.
5. Supplementary source of neutrons around which the Plutonium is compressed.

Many varieties of timers can trigger A-bombs, connected to mechanical firing-pin mechanisms or electric detonators. If the bomb is set up in a midtown office or apartment where regular A.C. house cur-

rent is available, any stock electric radio or stove timer makes a perfect firing device. It is easily obtained, accurate and has the further advantage of appearing completely innocent. For instance, an implosion



Another type of implosion bomb. In assembled form this is too large—18 to 24 in. in diameter—to fit into ordinary luggage. It can, however, be carried in a box or carton, disguised as an outside bowling ball or carried disassembled in two or more smaller suitcases or bags.

KEY

1. Plastic casing which may be divided in two or more sections and keyed for accurate assembly at a later time.
2. Detonator wiring links and primers.
3. "Shaped charge" type high explosive "lens" directs force of explosion inward.
4. Wedges of Plutonium are driven inward by the implosion to form a sphere of critical-mass size.
5. Chain reaction of Plutonium is expedited by a central, ball-shaped source of supplementary neutrons.

type bomb could be concealed in the oven of a gas or electric range and the stove's timer rigged to explode it at any given hour. For suitcase use, battery-operated timers or spring-driven clockworks can be

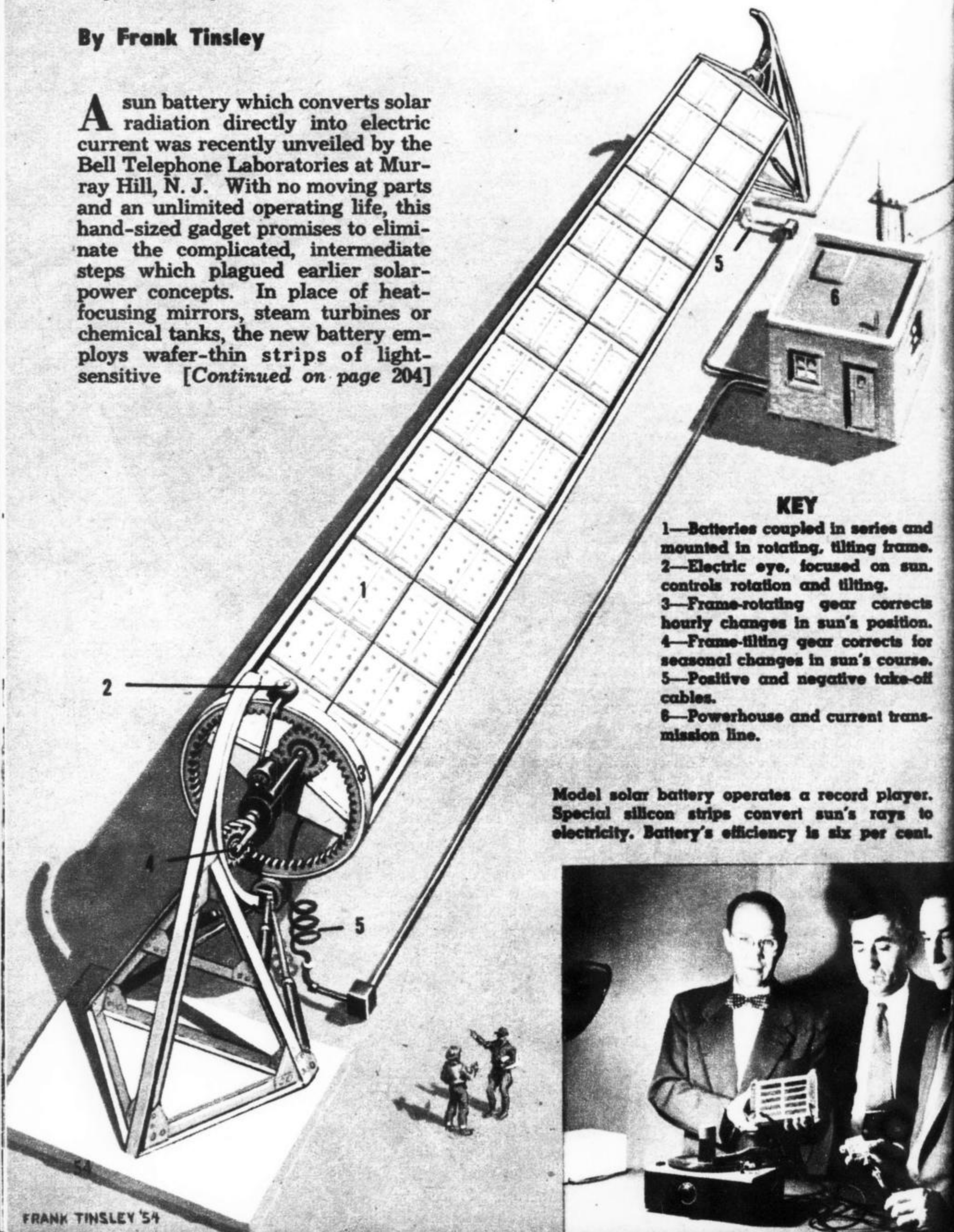
employed. The latter, however, has the disadvantage of its characteristic ticking noise. Even if well muffled this can usually be detected by stethoscopes or sound pick-ups. [Continued on page 203]

SUN BATTERY

This new battery converts solar rays directly into electricity.

By Frank Tinsley

A sun battery which converts solar radiation directly into electric current was recently unveiled by the Bell Telephone Laboratories at Murray Hill, N. J. With no moving parts and an unlimited operating life, this hand-sized gadget promises to eliminate the complicated, intermediate steps which plagued earlier solar-power concepts. In place of heat-focusing mirrors, steam turbines or chemical tanks, the new battery employs wafer-thin strips of light-sensitive [Continued on page 204]



KEY

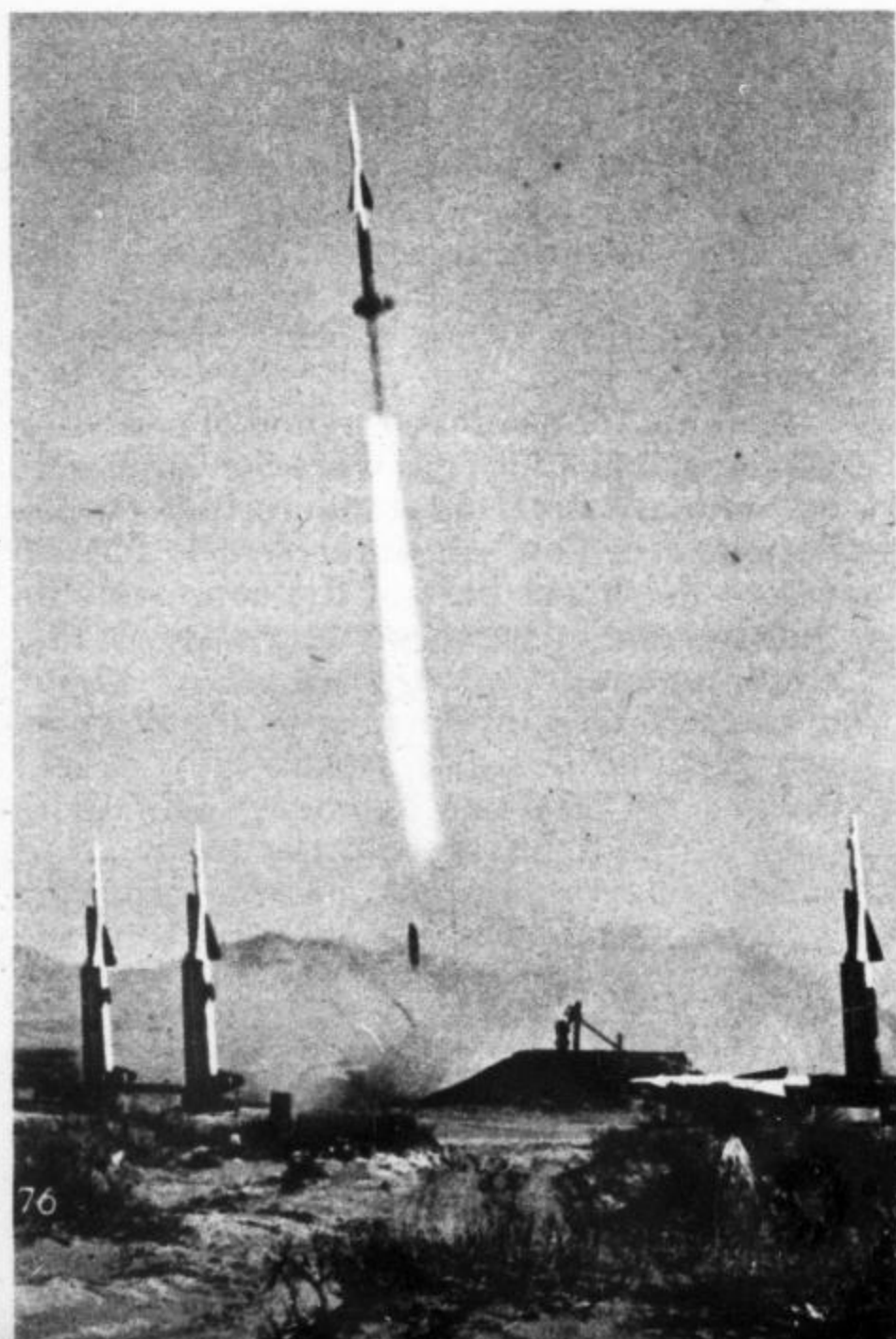
- 1—Batteries coupled in series and mounted in rotating, tilting frame.
- 2—Electric eye, focused on sun, controls rotation and tilting.
- 3—Frame-rotating gear corrects hourly changes in sun's position.
- 4—Frame-tilting gear corrects for seasonal changes in sun's course.
- 5—Positive and negative take-off cables.
- 6—Powerhouse and current transmission line.

Model solar battery operates a record player. Special silicon strips convert sun's rays to electricity. Battery's efficiency is six per cent.





Can Our Guided Missiles



At present we can stop high-flying bombers but we're sitting ducks for supersonic attackers, says this missile expert.

By Martin Caidin

Author:

Jets, Rockets And Guided Missiles

B-17 disintegrates, above, after direct hit by NIKE missile. NIKE in take-off, left, is 1,500-mph anti-bomber rocket. 2,500 are mass-produced monthly for the US Army for our defense.

Mechanix Illustrated

LURKING beneath the ocean surface 100 miles southeast of New York City was a 3,000 ton enemy submarine. Within the monster ship crewmen bent to their stations—in another minute a rocket with an atomic bomb in its nose would be launched against distant New York—while the submarine itself remained 240 feet below the water surface!

Technicians completed their final checks, electronic probers sealed the automatic devices and withdrew into the vessel. Soon the pressure compartment housing the missile was flooded and steel doors rolled back on their rails. Then the missile was freed, rolling gently in the sluggish currents of the dark underworld. The rocket lifted to the surface; gyroscopes spun madly to maintain equilibrium and the steel nose of the missile lifted into the cold morning air, water spilling from its sides.

An automatic switch tripped the booster rockets and the thirty-foot-long weapon lunged skyward; in seconds the rocket's own motors cut in and the empty booster fell back to the water and sank. The rocket climbed and turned slowly, reached 62 miles before it began to fall to earth. Four

fensive guided missile. Being able to hurl great numbers of atomic bombs into enemy cities is meaningless if we cannot hope to protect ourselves by reducing appreciably the number of bombs which may strike our own cities.

Against enemy high-speed bombers and fighters carrying A-bombs, and guided missiles carrying the atomic bomb, the United States is developing a bewildering variety of defensive missiles. This is not a new project, since our nation was engaged in this work even during World War II and rushed into production the Little Joe rocket which was launched from ships against Jap suicide planes. Today, thousands of NIKE missiles, which will defend America's leading cities, are rolling off the production lines. Other missiles which will augment NIKE'S role in our missile defenses against enemy bombers are also being stationed about the country.

Now American science is working feverishly to develop the "genius of the guided missiles"; the defensive rocket which can reach thousands of miles per hour speed, change course while in flight, carry a powerful warhead with a proximity fuze, and

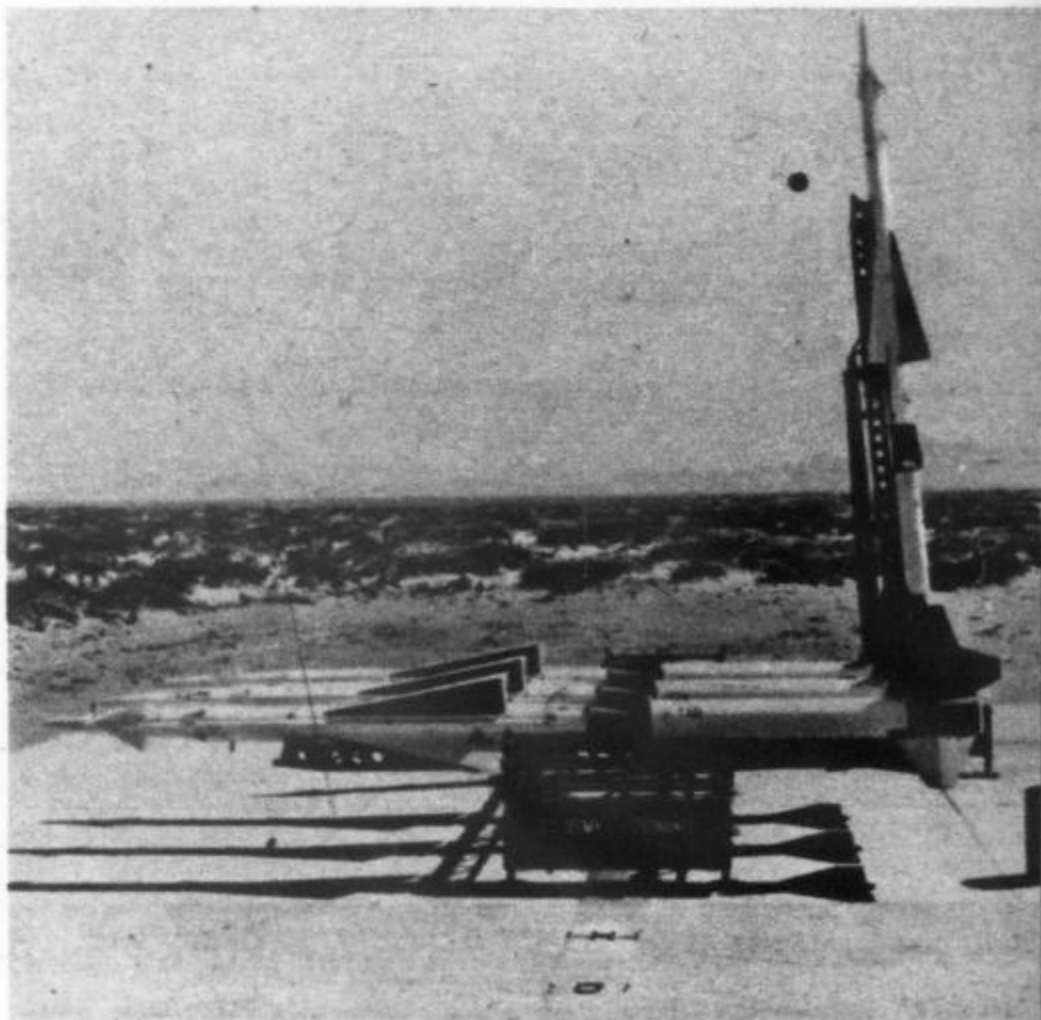
Stop Enemy Bombers?

minutes after it lifted above the water, 2,500 feet above New York, the rocket ceased to exist as the equivalent of 600,000 tons of TNT exploded. The first atomic bomb of World War III had struck.

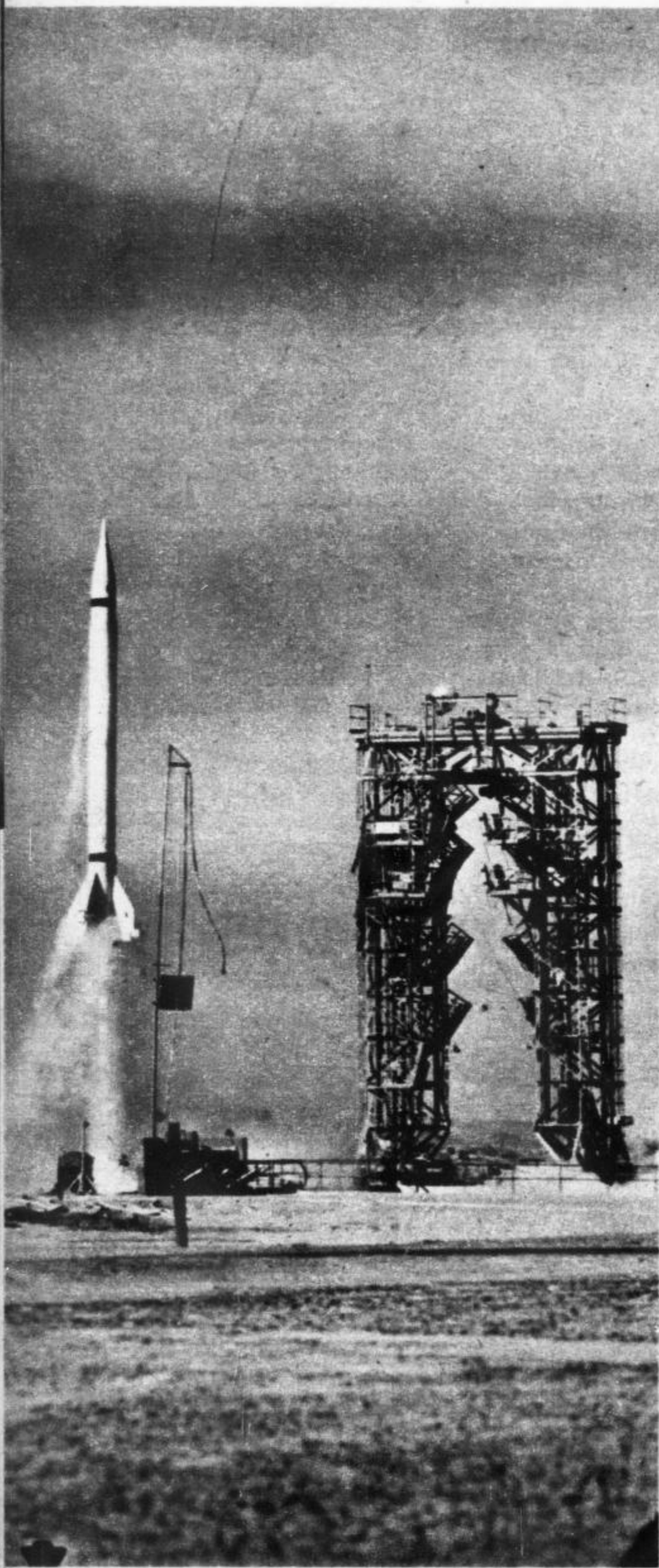
The possibility of the rocket attack you have just read is no flight of the imagination. World War III may start exactly in this fashion. Since 1945 there has been tremendous progress in the field of offensive guided missiles. The V-2 was only the start and has since been superseded by dozens of superior rocket weapons.

Of extreme importance to you, the American citizen who may one day be subject to atomic attack by enemy planes or rockets, is the fact that there has also been developed the defensive missiles, the robot-brain directed rockets which are designed to intercept and destroy not only attacking bombers, but also attacking guided missiles!

It is hardly a secret that much of the tremendous postwar effort in rocketry has been directed toward perfecting the de-



Launching battery of NIKE missiles ready to be fired. NIKE is effective against high-flying bombers, has "kill" efficiency of approximately 90 per cent.



Viking No. 3 thunders skyward from the White Sands test range. The Viking missiles are high-altitude research rockets developed by the Navy.

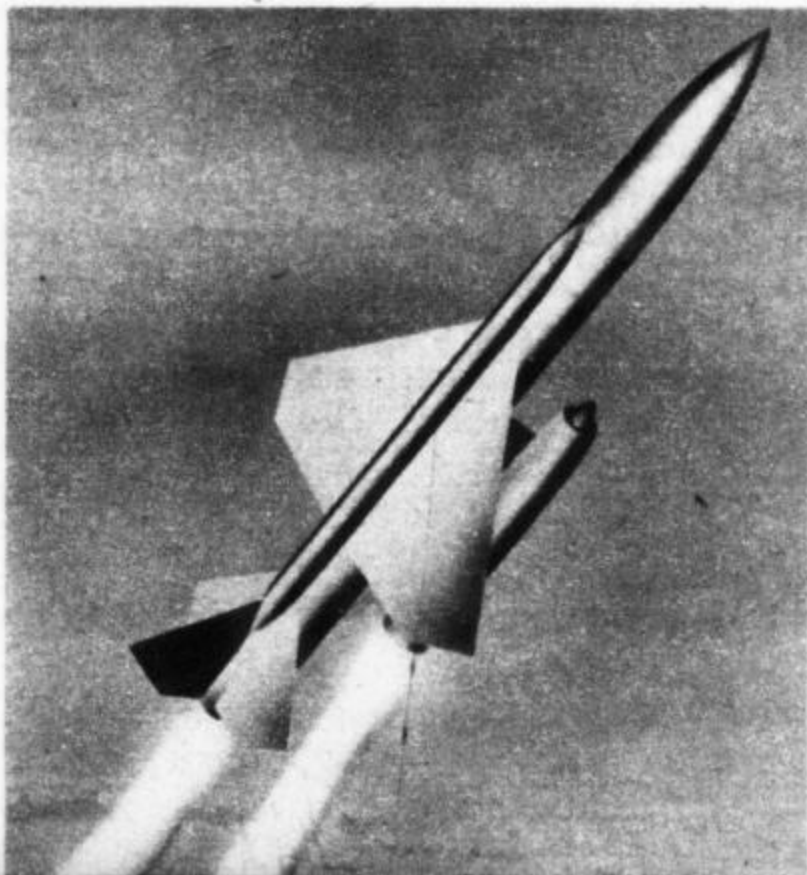
intercept an attacking missile which may be dropping to earth at two to four thousand miles per hour—and it must accomplish all this in one to three minutes time!

There exists an imperative need for such a weapon for Russian progress in offensive long-range rockets demands that this country be protected by the anti-missile defensive rockets.

In the current life-and-death race for guided missile supremacy between the United States and the Soviet Union, it appears that the Russians may have established a definite edge over our own country. The Russians captured almost all of the German rocket and experimental production facilities after the last war. They obtained the most advanced projects of German scientists. Immediately after the war Russia activated the V-2 manufacturing center at Mittelwerk, near Nordhausen, and soon were producing rockets for their own experimental activities. Russian troops were trained in the handling of large numbers of rocket weapons under combat conditions.

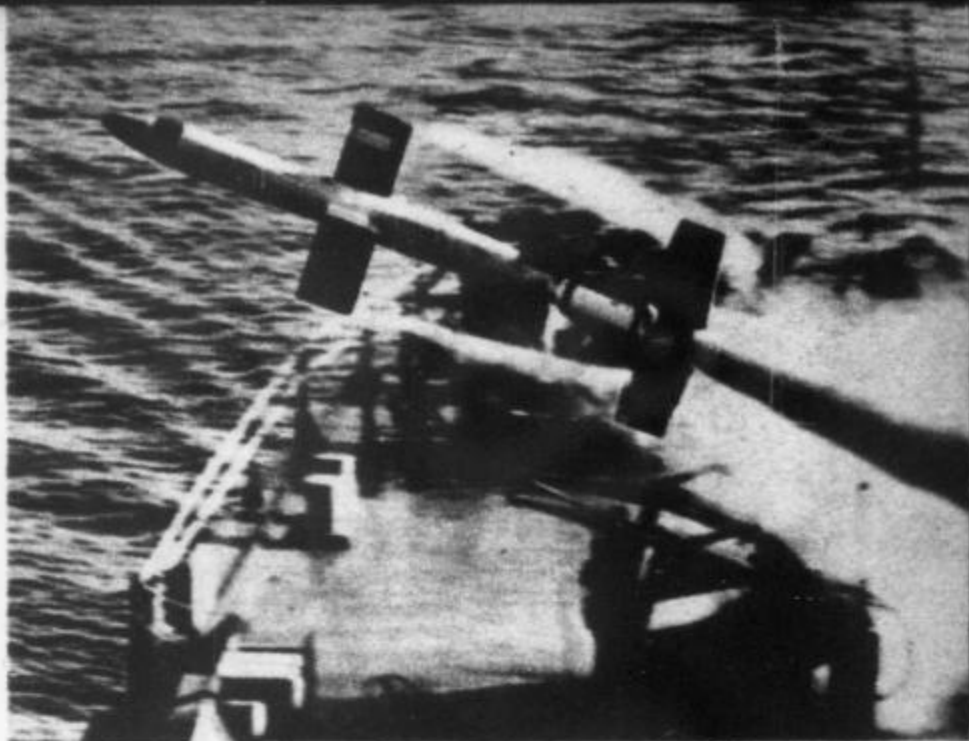
Tremendous rocket testing and launching facilities along the Baltic Coast from Peenemunde to Lithuania have been rebuilt and expanded; tests here have been conducted for years with various types of missiles believed to be superior in many respects to comparable American weapons. Since 1946 there have been disquieting reports from Sweden and Bornholm of constant rocket firing from the Baltic sites. Missiles have been launched against Ezel Island from Kohlberg, near Stettin. This would indicate that the Russians for years have had 400 mile range rockets—doubling the range of the famous wartime V-2.

Fast-climbing, 1500-mph Boeing F-99 Bomarc is pilotless interceptor, can maneuver to follow any evasive attempts of an enemy bomber.





Boeing GAPA, 1500-mph anti-bomber rocket, has been tested for years. Lessons of GAPA provide necessary data to build new anti-bomber rockets.



One of first U.S. anti-bomber rockets, Lark was developed as weapon against Jap bombers in WW II. Today Lark is replaced by such missiles as NIKE.

The most significant effort which we know the Russians are making is their development of a two-stage, long-range missile with a range estimated at 2,000 miles. The tremendous rocket grosses 90 tons—compare this figure to the five-ton weight of the U. S. Navy Viking! The booster stage appears to be an entirely new Russian motor using liquid oxygen and kerosene. Known as the “103” motor, it delivers the amazing thrust of 264,000 pounds! The second stage is the improved V-2.

An indication of what the “103” motor means to rocket performance can best be appreciated by comparing this Russian product to the Viking. The latter, with a 10-ton thrust motor, has climbed 136 miles above the earth and reached 4,100 mph. The “103” motor is more than 13 times as powerful as that of the Viking’s!

Another missile is a single-stage,

winged-rocket design which may be an outgrowth of the German A-9 project but using the “103” motor. Also reported is a tactical missile with a 60-mile range using a motor of nine tons thrust.

These new developments indicate that the Soviet Union is apparently well on the way toward perfecting the true inter-continental guided missile with a range of several thousand miles. The seriousness of the “103” motor and parallel Russian achievements cannot be underestimated. Unless the United States matches this superlative Russian development, we are, or will soon be, trailing our distant adversary in guided missile weapons.

The submarine-launched missile constitutes a tremendous threat—now—against our coastal cities. As of this moment, there is only one way to stop a rocket hurtling toward the ground at two thousand miles per hour and that [Continued on page 205]

Technicians affix solid-fuel rocket booster to the Martin B-61 Matador, pilotless bomber. B-61 is first Air Force pilotless plane to be put in production.



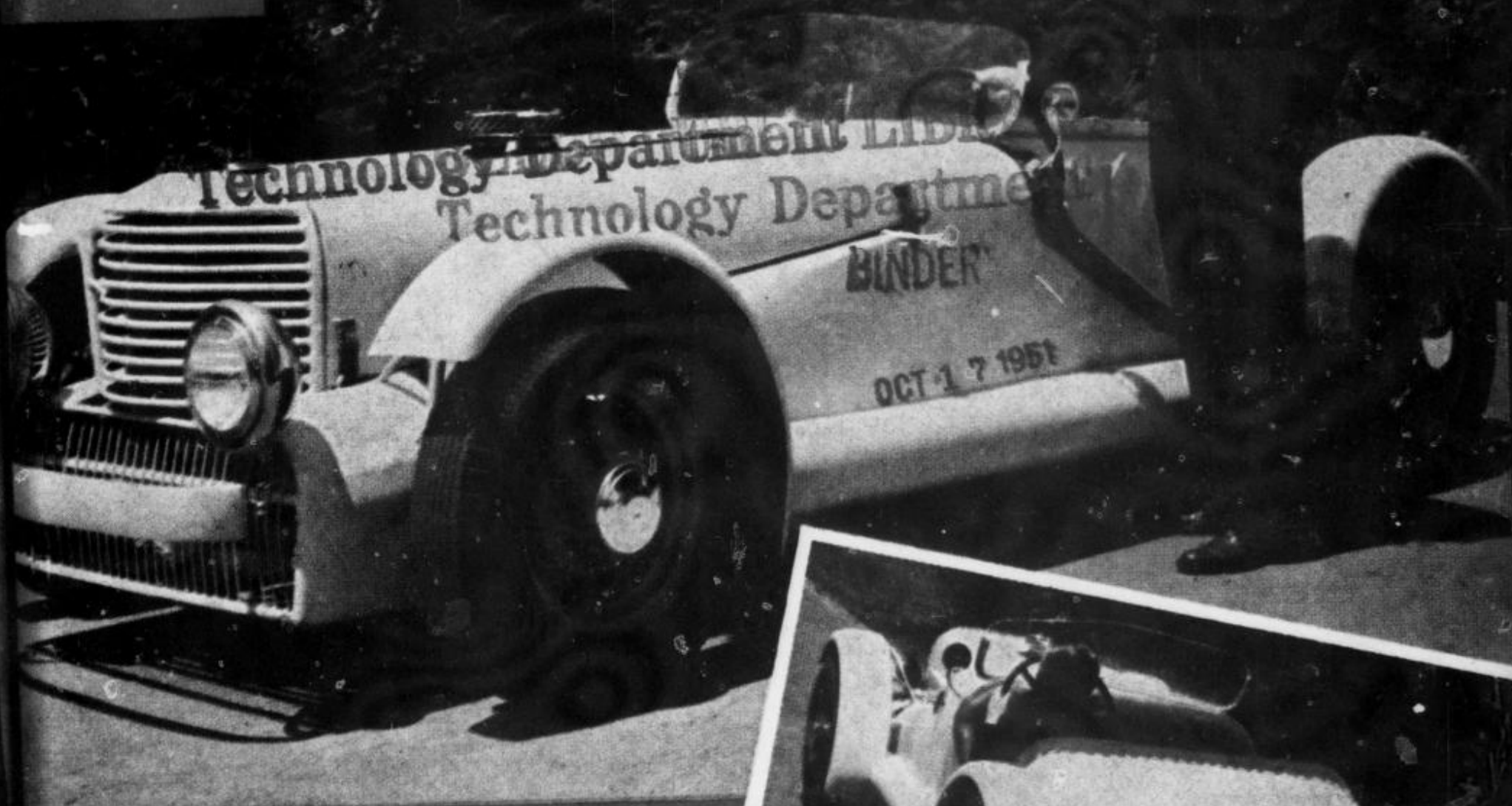
Matador is in squadron service, now is based in Germany and other overseas points. A 600-mph robot, it can carry atomic bomb for 500 miles.



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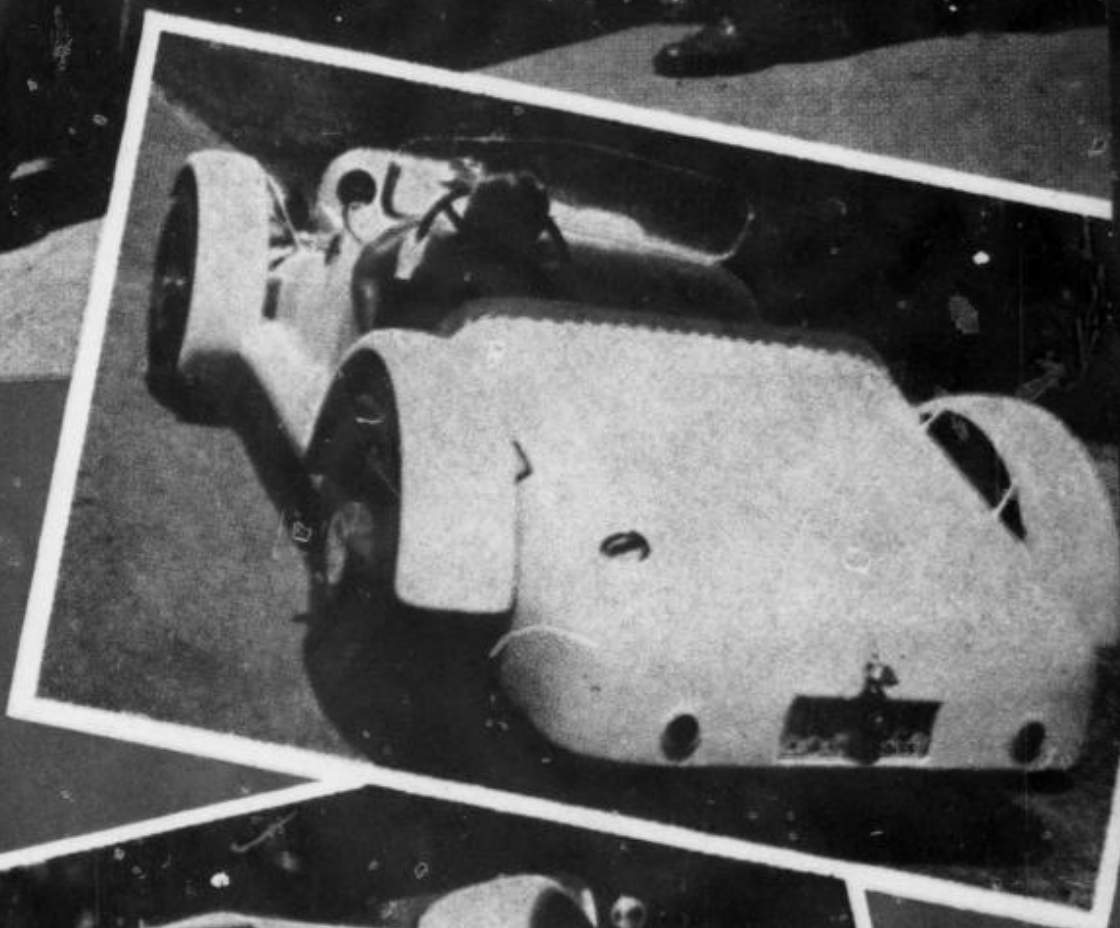
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Why Don't We Build...

FLYING TANKS



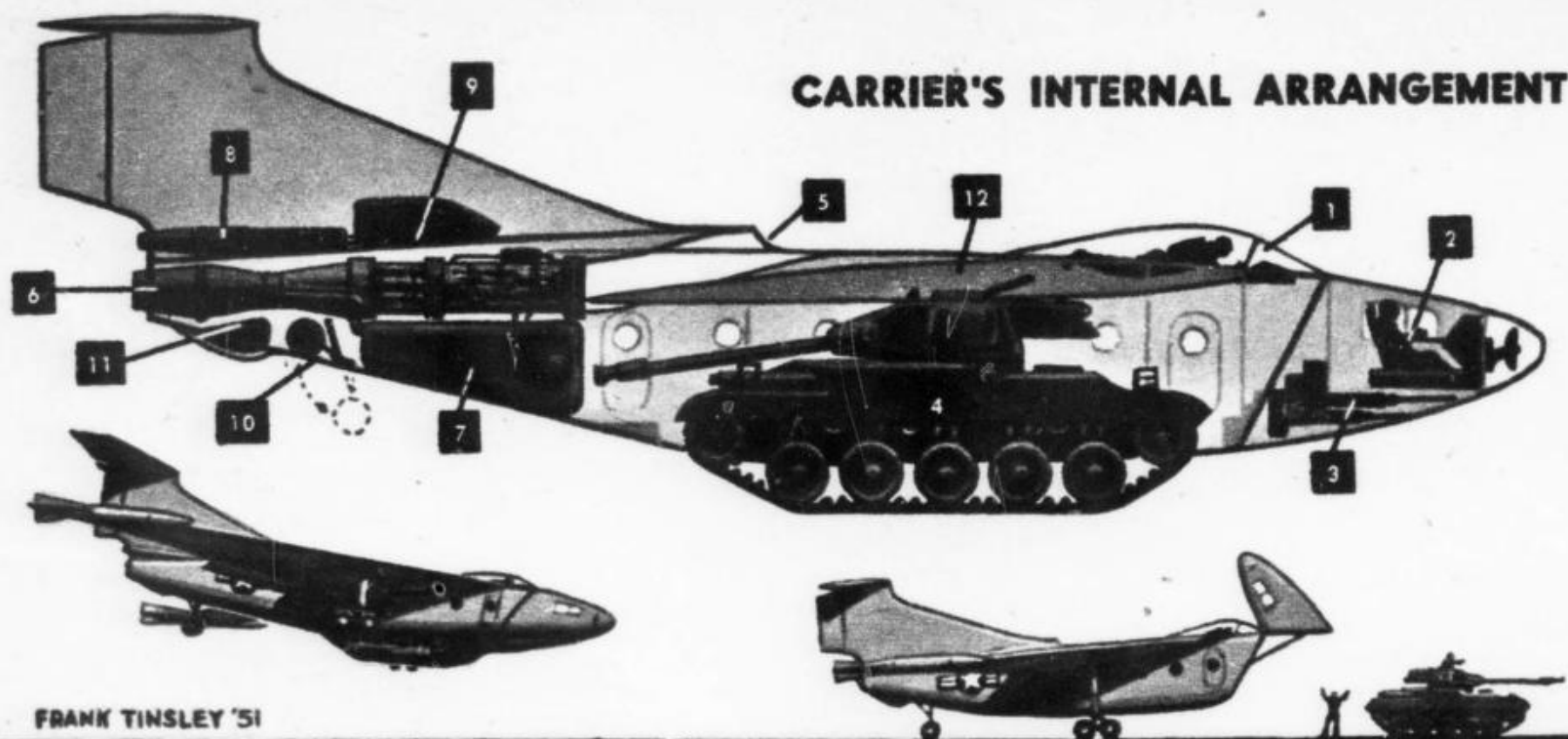


**Armored divisions with wings are needed to support
our airborne infantry, artillery and supply lines.**

By Frank Tinsley

THE importance of airborne armies has been brought into finer focus by the drives and counterdrives of the Korean war. Many of our keenest military minds now feel that there is only one answer to the threat of Communism's armed hordes. This is the superior mobility of highly trained, heavily armed, airborne task forces. Like minute men, they can be rushed instantly to any point of attack, withdrawn with equal speed and poised again for the next blow.

Thanks to our experience in World War II, the Berlin Airlift



FRANK TINSLEY '51

1. Pilot in prone cockpit
2. Navigator-radar-radio operator
3. Six 20mm shell guns
4. Tank coupled rigidly to airframe
5. Air intake port for engine
6. 10,000-lb. thrust engine with after-burner
7. Jet fuel tank for engine
8. Liquid rocket engine for take-off and combat
9. Fuel tank for rocket
10. Retractable tail wheel
11. Parachute break for landing on short fields
12. Sweptback wings of large area

and the present MATS overseas operations, we have built up an invaluable know-how in the art of mass military flight. Our only lack is new aircraft and ground equipment designed specifically for winged warfare.

Much of this is now in the works. Guns, motor vehicles and material of every description are being revamped for air transport. Excess weight has been sweated off, bulk cut down and dimensions shrunk to fit existing planes. Even now our airborne divisions are being equipped with heavy artillery, motor transport, complex communication nets and complete field hospitals, all droppable by parachute. The only item that seems lacking, unfortunately, is the one most vital in modern, mobile warfare—armor!

The problem is not being ignored. Specially designed, ultra-light tanks have been carried aloft experimentally. These, however, are so skimpily armed and armored as to be of little practical value on the battlefield. What is really needed is a relatively inexpensive, semi-expendable air carrier, capable of lifting the standard Walker or Patton tank complete with its crew, fuel and ammunition. This is admittedly a tough assignment. The modern medium tank with its heavy gun, armor and service load probably is the heaviest

At left, tank carrier is about to land on its free-wheeling tank treads which replace conventional heavy landing gear. Above, tank is lowered and carrier is raised on its wheels. Tank emerges.

single package in the whole roster of military equipment. None but the largest and most powerful of today's piston-engined planes can tackle it. In the accompanying illustrations, one possible form of such a carrier is shown.

In this model, the necessity for a cargo hold with an ultra-heavy floor is by-passed by slinging the tank in a bottomless well situated at the plane's center of gravity. When loaded, the tank's bottom plates seal this opening so that only the lower portion of its tracks protrude below the plane's belly. Coupled rigidly to its structure, the tank bears the aircraft's weight while on the ground and permits the latter to take off and land on the tank's free-wheeling track gear. This eliminates the large landing wheels that would otherwise be necessary to handle the load. In addition the plane is equipped with light auxiliary wheels for use when not carrying tanks.

This light landing gear is fitted with jacks so that the plane can be raised slightly for the tank's entry. The plane's nose section is tilted upward out of the way and the tank backs directly into the cargo well. The plane then is lowered into coupling position and the tank secured rigidly to its weight-bearing structure. The main landing gear then is retracted a bit further to a point where it serves as side steadying wheels when the plane taxis to its take-off strip. In landing, the process is reversed and the tank is released ready for action.

In order to make the tank carrier available for other missions, a folding door, bucket seats and litter attachments are pro-

CROSS SECTION OF TANK HOLD



At top is shown cross section of plane's tank hold. Bucket seats and litters fold when tank is carried. They are lowered and locked for carriage of troops, battle casualties, army personnel, etc.

At left, after tank is unloaded, carrier is lowered to normal position for loading of wounded or supplies. Then it takes off, at right, on its own wing-wheels for return flight to its base airport.

vided to convert the open well into a snug cargo hold. With the floor swung down and locked in place, wounded can be evacuated or troops and miscellaneous cargo transported at high speed. The generous wing area required for tank carriage permits short take-offs and slow landings on restricted fields. Take-off may be augmented by Jato assist or by the boost of a liquid rocket engine as shown in the illustrations. A B-47 type parachute brake is packed in the tail bumper to shorten landings.

Opening on the cargo hold and just aft of it is a vestibule with passenger escape doors on either side. A chemical toilet is situated here, also. Forward in the movable nose section are two more escape doors and the navigator's post. He is surrounded by radio installations and operates the radar unit mounted in a plastic nose fairing. Beneath him in the slanting belly is a battery of six 20mm shell guns for ground strafing. These are augmented by two Tiny Tim rockets carried on launchers beneath the wing roots.

The engine is mounted in the upper section of the tail and is fitted with an afterburner which, in an emergency, can almost double the 10,000-pound thrust. Air intake is through a large scoop atop the fuselage just ahead of the engine. Exhaust is directed through a nozzle in the tail below the overhanging tail surfaces. Fuel is carried beneath the engine in a large, self-sealing, non-explosive tank. The whole installation is readily accessible for adjustment, repair or a complete engine change. If necessary, a compact liquid-rocket

booster engine and its fuel can be mounted in the fin root above the regular gas turbine.

A flying tank carrier such as the one described is not only practical but an absolute necessity if we are to further develop America's airborne armies. Operating from advanced air strips, it can multiply the impact of our armor by shifting it quickly from one battlefield to another, concentrating it wherever needed.

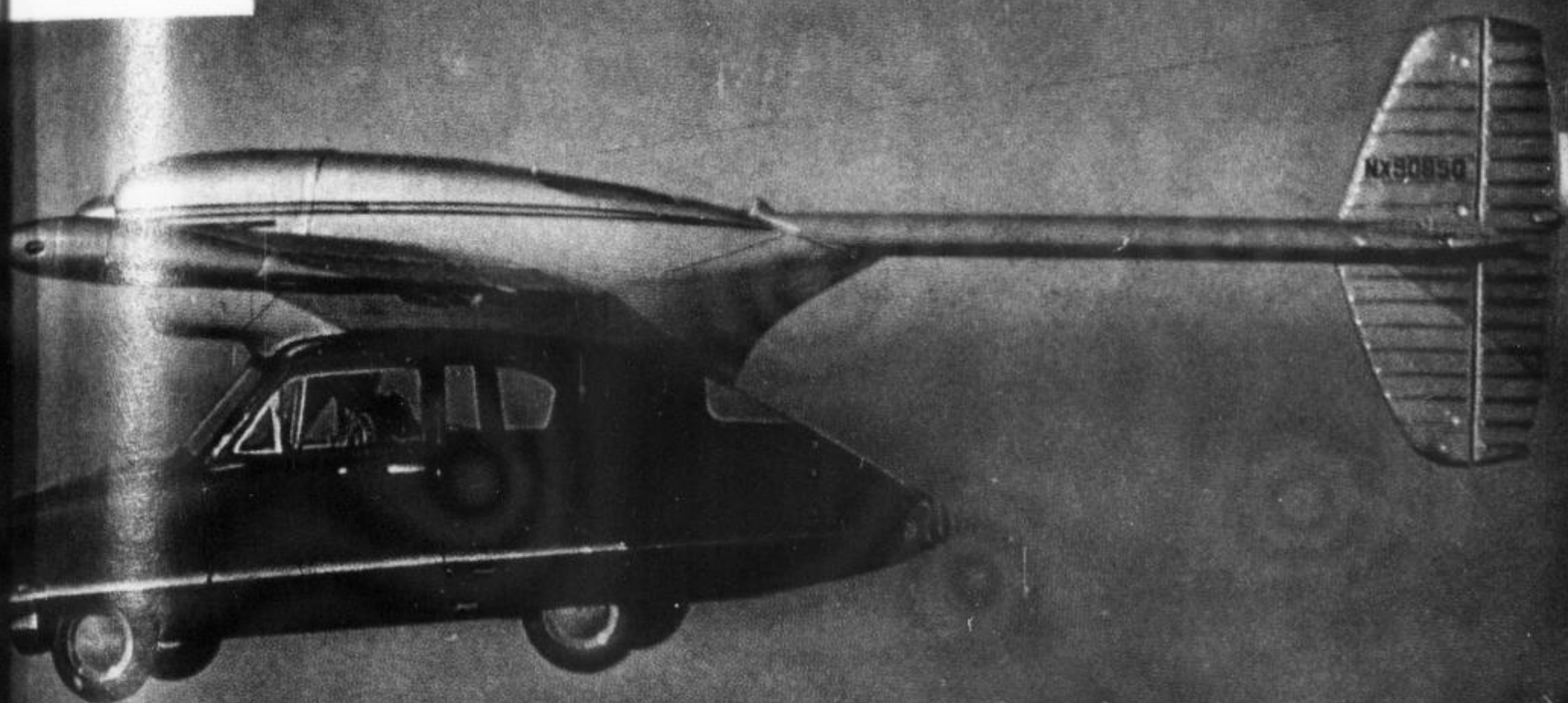
Why don't we have aerial tank carriers—right now? •



Closest so far is expensive Fairchild C-82 shown here loading a small tank.

MECHANIX ILLUSTRATED[®]

SEPTEMBER



Flying Automobile--See Page 74

FIRST PORTABLE TELEVISION SET SEE PAGE 78
THE "MIRACLE" DRUGS CAN KILL YOU

mechanix illustrated

Title Registered U.S. Patent Office

september 1948

Cover photo*by Ross-Pix

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Flying Automobile— '48 Model

On land it's a sleek-looking plastic car, below. But in the air it becomes the fuselage of the "planemobile," above.



THE motorcycle cop drew up alongside the speeding car and motioned for the driver to pull over to the curb at the corner.

"What do you think you're doing?" he sneered. "Flyin'?"

"Honest, officer," came the startled reply, "I forgot that I wasn't!"

Maybe that seems a bit far-fetched to you. But don't forget that the driving problems in an age of flying automobiles are going to be a lot more complicated than those in our own day of "old-fashioned" cars.

Citizens of San Diego aren't shocked any more by the sight of an auto with wings sprouting from its sleek body flying along in the sky. The unusual machine is the "Convair Flying Automobile," designed by aeronautical engineer Theodore P. Hall and built by Consolidated Vultee Aircraft Corporation. This combination

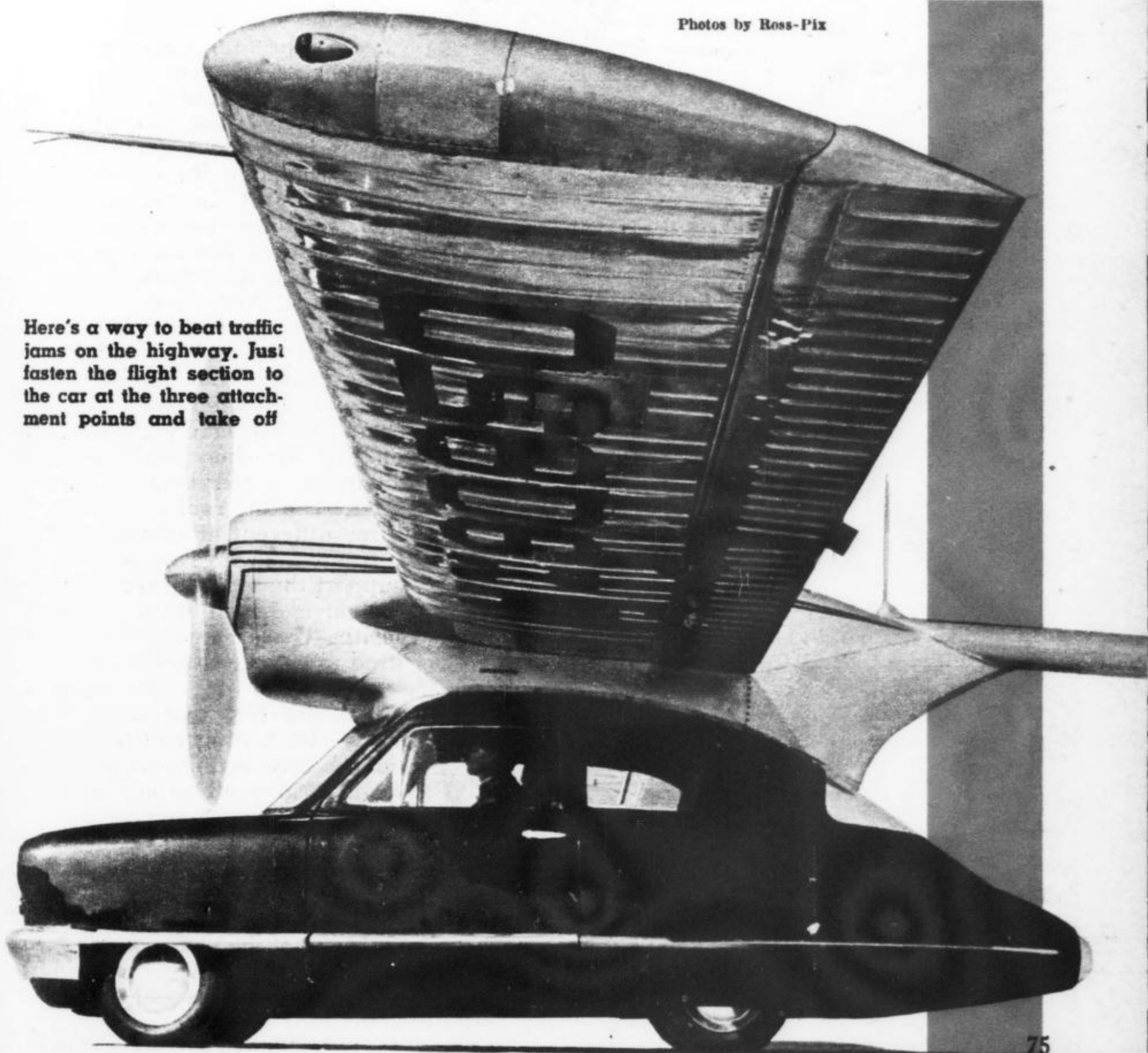
auto-plane is still in the experimental stage. Unlike an earlier unsuccessful model which crashed, this one has passed its flight tests with flying colors. The way is now clear for commercial improvements which will make it available to the general public.

Designer Hall has been working with this type of vehicle since 1938. His early models used only one engine for both the plane and the car. Hall wasn't satisfied with tests. He felt that the efficiency of the car on the ground was hampered by the gas-consuming airplane engine. So he proceeded to experiment with separate engines and came up with the present '48 model.

This machine has two separate sets of controls as well as engines. The trim, plastic-bodied auto has its own 25½ hp Crosley motor in the rear and the flying section is powered by a 190 hp Lycoming

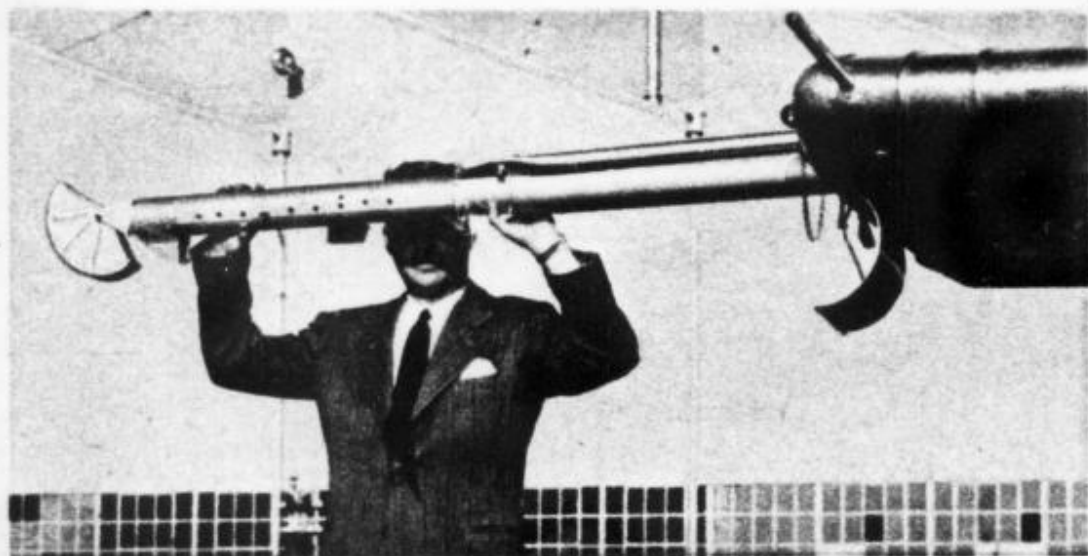
Photos by Ross-Pix

Here's a way to beat traffic jams on the highway. Just fasten the flight section to the car at the three attachment points and take off

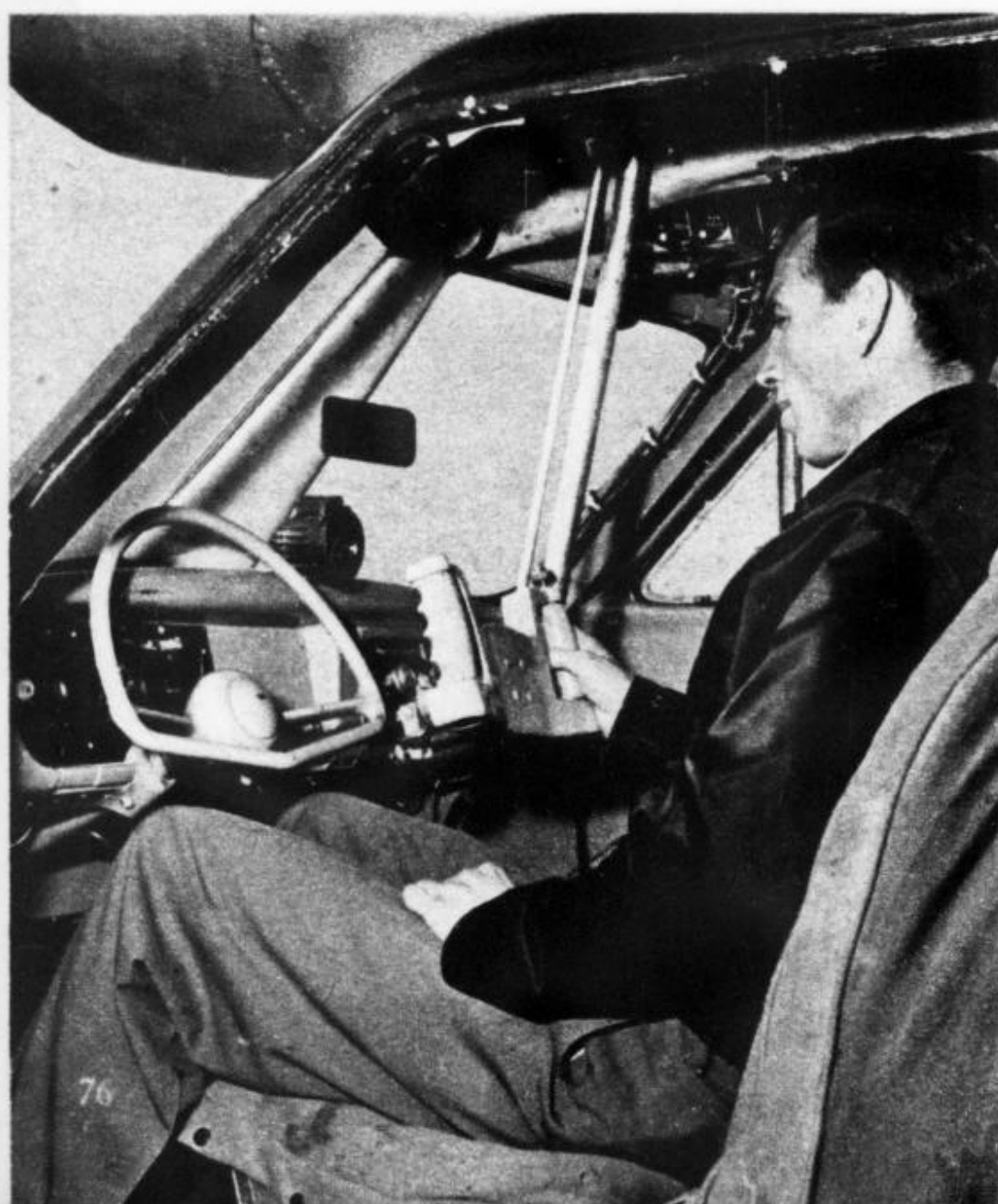




Aluminum jacks hold up plane as car drives away. Below, jacks are stored inside wing when not in use.



You can't drive the car with airplane controls. At left is the steering wheel and at right the joy stick.



engine. The four-seater car actually serves as a landing gear for the plane. It's sturdily constructed and a steel tube roof structure makes it strong enough to stand up under rough landings. Hall figures that the roof can support more than six times the weight of the flight section. The car is equipped with shock absorbers, hydraulic brakes and fluid drive.

On flying performance the plane compares favorably with four-place airplanes now on the market. Its all-metal wing has a $34\frac{1}{2}$ -foot span. The airplane parts won't fly off the car when you're zooming along overhead because they're secured to the roof of the auto at three different attachment points.

Inside the wings are jacks which support the airplane section when the car is driven out from underneath. These same jacks can be used to change flat tires, too.

Both Hall and the company stress the fact that more work, study and testing will have to be done before definite plans can be made. So don't count on head-in-the-clouds driving yet.

But they firmly believe that within a few years you're going to ask your girl out for a spin and offer her a choice of highway or skyway. If the traffic on the highway gets heavy, you'll be able to put on your wings and take off. •

Mechanix Illustrated



IN AN F-80 BUILT FOR TWO

THIS is the TF-80C. Like its fighter counterpart, the F-80, it is fast, sleek, jet-propelled. But there is one important difference. *The TF-80C is a two-seater!* It's a trainer-fighter (TF) — the Air Force's first "jet" fully equipped for both instructor and student.

The new "Shooting Star" trainer will help speed jet training for Aviation Cadets. Instead of the usual "build up" in propeller-driven fighters, the student will be able to begin jet training as soon as he completes basic training. It means a safer, more interesting training program.

The TF-80C is powered by the same engine and has the same general features as the standard F-80B. The fuselage, however, is three

feet longer and contains two completely instrumented cockpits. The instructor sits in the front seat, may switch off the dual controls in the student's cockpit at any time.

Young men who choose careers in the U. S. Air Force share in the training advantages of projects such as this. You'll have a chance to learn more of these benefits on Air Force Day — September 18.

Attend the Air Force Day events in your community or at your nearest Air Force Base. It will be a good opportunity to find out about the Aviation Cadets. Learn how you can qualify and make an appointment to take your examinations for pilot training.

U. S. Army and U. S. Air Force Recruiting Service

★
**AIR FORCE DAY IS
SEPTEMBER 18, 1948**
★



MECHANIX ILLUSTRATED

SEPTEMBER

15¢



Odd Bikes—Page 70

GADGETS CAN MAKE YOUR FORTUNE
AUTO ROAD RACING REVIVED BY SPORTSMEN

mechanix illustrated

Title Registered U.S. Patent Office

september 1949

Cover photo by Grayson Tewksbury

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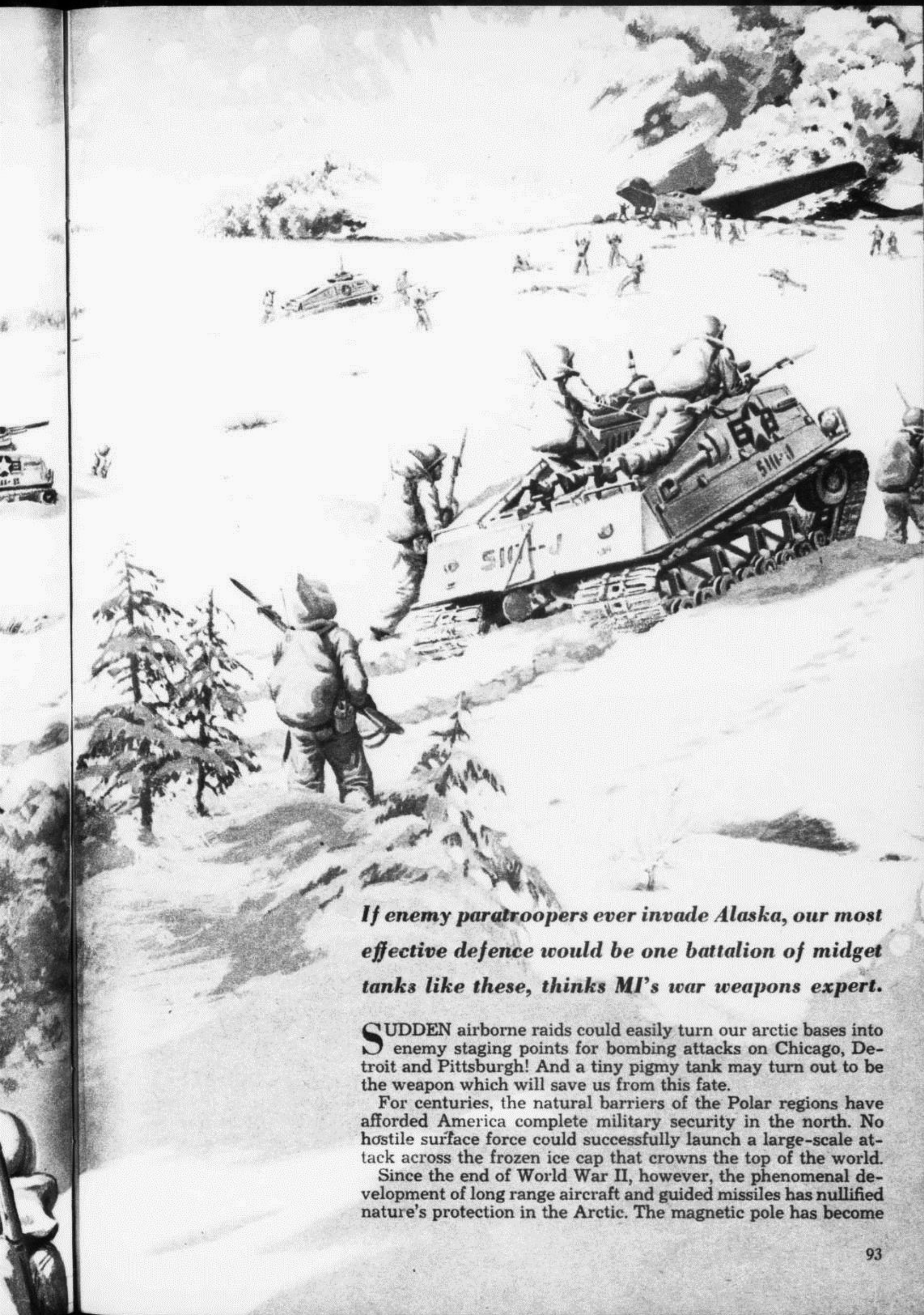
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OF CIRCULATIONS

September, 1949

Arctic Pigmy Tank

By Frank Tinsley





If enemy paratroopers ever invade Alaska, our most effective defence would be one battalion of midget tanks like these, thinks MI's war weapons expert.

SUDDEN airborne raids could easily turn our arctic bases into enemy staging points for bombing attacks on Chicago, Detroit and Pittsburgh! And a tiny pigmy tank may turn out to be the weapon which will save us from this fate.

For centuries, the natural barriers of the Polar regions have afforded America complete military security in the north. No hostile surface force could successfully launch a large-scale attack across the frozen ice cap that crowns the top of the world.

Since the end of World War II, however, the phenomenal development of long range aircraft and guided missiles has nullified nature's protection in the Arctic. The magnetic pole has become

a mere signpost to point the shortest routes between the industrial centers of the northern hemisphere.

The rapid growth of Polar air bases is proof that the great powers are well aware of the changing situation. Russia has established a system of flying fields in eastern Siberia and we have countered with a triangle of huge Alaskan air depots.

The ground defence of these vital outposts has become a pressing problem for us. It has been reported that at least eight Russian paratroop divisions are stationed at jumping-off points a few short hours from our Alaskan outposts. To combat such possible attacks we need a comparatively small, highly mobile striking force, capable of destroying enemy airheads before they can be consolidated. This means a force built around fast, light tanks with heavy firepower.

Unfortunately, at present we have no small, speedy, paratroop destroyer to carry out this strategy. Our standard tanks were designed mainly for operations in North African and European terrain. They're too heavy and slow for agile Arctic warfare. During last year's maneuvers even our "light" tanks bogged down completely in the queasy Alaskan marshes.

Obviously, we need an entirely new type of ultra-light, armored vehicle designed to operate under Arctic conditions. We have a successful cargo carrier that may serve as a design springboard—the Weasel. It was produced during the last war to meet very similar operating conditions. With its unusually wide, caterpillar tracks and watertight hull, it could snowshoe across deep drifts, ride the surface of quaking bogs and belly through muddy swamps that would stall any other vehicle.

Using this Weasel as a model, let's see what we can produce in the way of an Arctic Pigmy Tank to run down enemy paratroopers in the Alaskan wilderness.

The machine must be small and light, with tracks as wide as possible to give it maximum bearing surface. Its armor need be only thick enough to turn small-arms and machinegun fire—it will have to depend upon agility to evade bazooka and anti-tank shells. Its armament, on the other hand, should be heavy not in actual weight but in anti-personnel fire power.

Getting to work with slide rule and drafting tools, we find a fairly presentable whippet tank shaping up on the drawing board. This Pigmy is as small as crew, armament and track limitations permit. At its tallest point, the deck is shoulder high to a six-foot GI and the turret tops his helmet by a scant

six inches. The overall height with periscope fully retracted is 7 feet 6 inches, just enough for good visibility in Alaskan forest and bush areas.

As wide as it is long, with an extremely low center of gravity, the Pigmy is exceptionally stable—almost impossible to capsize under ordinary conditions. The Weasel-type tracks are each three feet in width, giving the machine a snowshoe-like traction surface of 45 square feet—about two-thirds of its overall size!

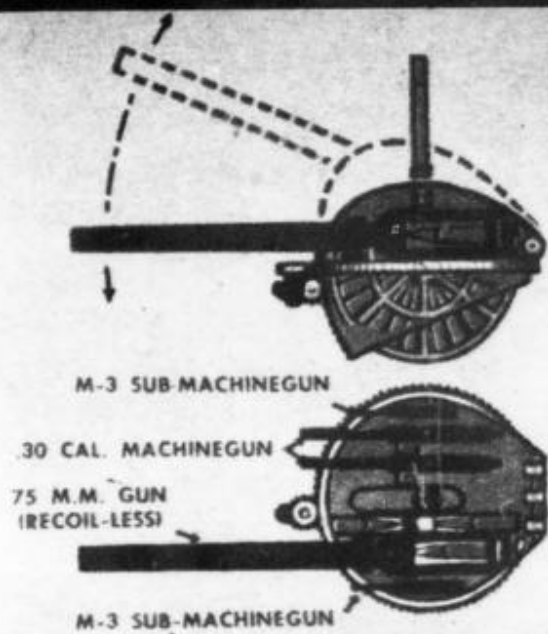
The Pigmy's tucked-up belly permits it to negotiate all sorts of rugged terrain. A pair of bullet-proof, rubber pontoons concealed in side compartments provide for deep water crossings. A three-bladed propeller, taking off from the rear of the gearbox and a small rudder provide marine propulsion and control. Both are mounted above the belly line and are protected from ground damage by a heavy plate.

The power plant consists of a six-cylinder version of the new aircooled tank engine recently developed for the Ordnance Department. It's equipped with an automatic transmission and the usual tank clutches and brakes. The engine and fan are mounted amidships in a fireproof compartment with cooling louvres opening on the rear deck. An airplane-type rubber fuel cell occupies the space forward of the fire wall. The transmission and rear end take up the after section of the belly.

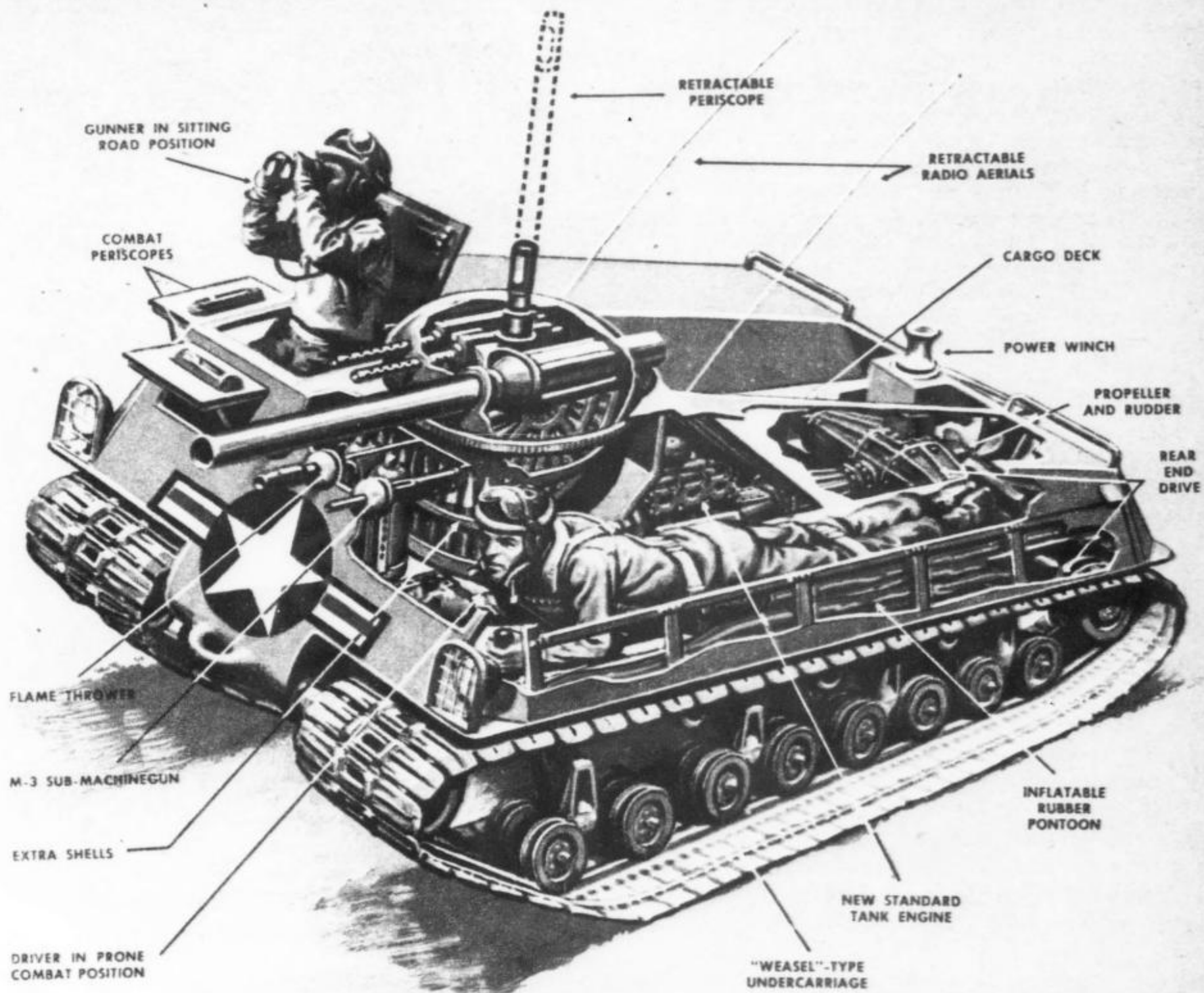
The regular crew of this Arctic Pigmy Tank consists of two highly trained non-coms. A sergeant-gunner commands the combat team and a corporal driver-mechanic operates the tank. Each is trained to replace the other. In an emergency, the tank can be operated single-handed.

For this purpose, all driving and fire controls are duplicated. And to minimize the effect of an enemy hit, the men are widely separated, each occupying individual armored compartments atop the tracks. During action, they ride in "prone pilot beds" similar to those recently adopted by the Air Force. Combat periscopes, built into the forward and side hatches, provide good visibility ahead and to the flanks. In addition, a submarine-type periscope permits a telescopic, 360 degree field of vision.

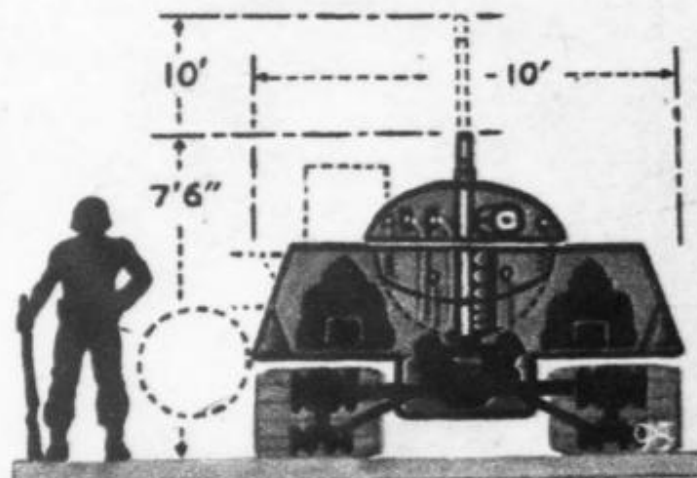
The Pigmy's armament is varied. A 75mm recoil-less gun takes care of long range bombardment. The gun's light weight and compactness—105 pounds, 80x12 inches—make it a natural for light tank use. It's fitted with a gas-operated, semi-automatic loading mechanism and a drum-type magazine. Sighting is through the telescopic periscope. [Continued on page 148]



PROFILE AND PLAN VIEW OF 360° TILTING TURRET, SHOWING ARMAMENT ARRANGEMENT



FRONT VIEW OF PIGMY TANK SHOWING COMPARATIVE SIZE AND ARRANGEMENT, FUEL AND AMMUNITION SHOWN IN RED



FRANK TINSLEY '49

MECHANIX ILLUSTRATED

15^c

SEPTEMBER



See page 80

**YOUR WORKSHOP HOBBY CAN MAKE YOU RICH
COMPLETE PLANS FOR 24-FOOT SCHOONER**

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September 1950

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Relaxing Gas — Latest War Weapon





**Battles will be bloodless
when nations start using
this gas which destroys
the will to fight back.**

By Frank Tinsley

A FLEET of long-range bombers corkscrews through a hole in the city's defense net with its fighter escorts running interference. Bomb-bay doors whip open and rack loads of queer, green-painted cylinders arc gracefully earthward.

Below, the sweating ack-ack crews stare at each other in weary surprise. The first bombs have landed yet no deadly atomic mushrooms have sprouted skyward! Only a soft, persistent thud-



Hundreds of thousands of cylinders like those above, filled with deadly gas, are stored in U. S. arsenals waiting to be packed into shells and bombs to be used when and if an enemy makes the decision first. With the advent of relaxing gas, though, it may be more humanitarian to use gas than to refrain from doing so.

ding can be heard between the crack of the guns. The crews exchange questioning glances. Can all those bombs be duds?

The innocuous looking canisters lie in the streets and alleys of the city. Clusters of them dot the parks and fields outside the walls. After the first silly "plops," nothing has happened. There is no ominous ticking to indicate a time fuse, no threatening swirl of gas. A surge of relief spreads through the streets. Nervous giggles broaden into cackles and grow into loud, contemptuous laughter. A few brave souls nudge and kick the canisters and send them rolling merrily.

The gayety heightens. It seems to be tinged with hysteria. People grow weak with it and sink wearily down to rest on the curbstones. A feeling of happy relaxation descends upon the city—a slowly spreading wave of drowsy friendliness that extends even to the planes above.

Around the ack-ack batteries, the canisters lie thickly and the surge of friendliness is even more sudden. As the invisible gas swirls and spreads, the firing becomes sporadic and soon the guns fall silent. Tired crews perch laughingly on sandbags,

watching with lazy unconcern the opening of parachutes in the low-lying clouds above them. More and more of the chutes blossom until the sky is full of them. Down through the quiet dawn they sink to earth and from their folds spring grim, gas-masked paratroopers. In a matter of minutes the city has surrendered, without a single battle casualty on either side!

Is all this a sweet and silly dream? While the foregoing description of a bloodless invasion sounds almost too easy, qualified chemical warfare officers say that it is entirely within the bounds of possibility. New developments and techniques have at last brought so-called "nerve gas" to the point where it makes sense militarily.

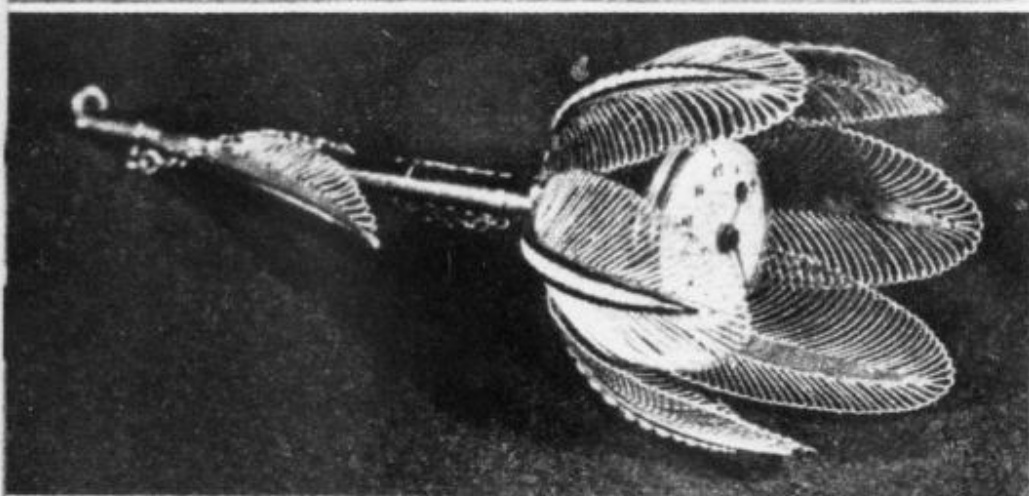
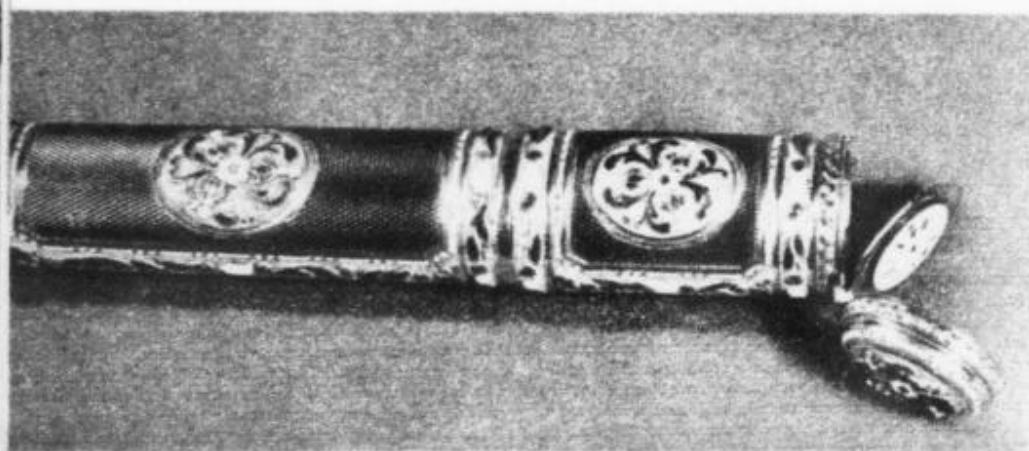
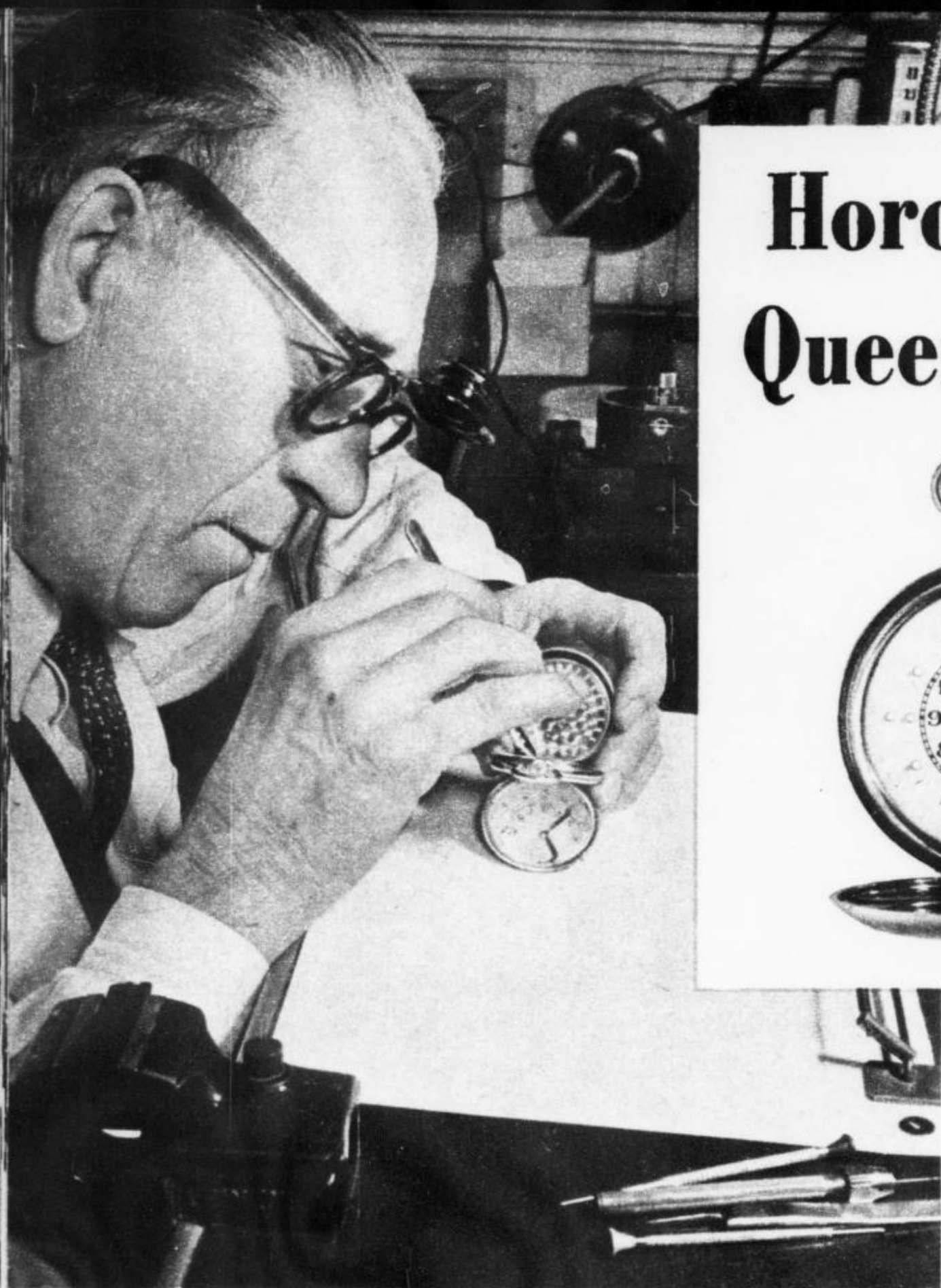
Like many weapons, it is two-edged, however. Such a power could also arm dictators with the ability to hold their citizens in their power completely.

If some efficient method of use and concentration could be developed, relaxing gas represents a step toward more humanitarian warfare—if any warfare can be called humanitarian. From the innocent civilian's point of view, relaxing gas would be far preferable to the H-bomb. •

Horological Queeriosities



Timepiece for sightless has three raised dots at 12 and two dots at 3, 6 and 9. They orient the user to the location of other numerals.



Louis XVI vanity case, top, has a dime-sized watch at end. It holds pills and hairpins. Gold tulip watch, above, has a slide on the stem to open and close petals.

IF you've got a moment to spare, be sure to look around our museum of "horological queeriosities." Take a good gander at the world's weirdest watches.

Ever since horologists first began fiddling with time, they've been trying to turn out bigger, better and stranger timepieces. From the early days when a candle was marked out into sections, each of which burned a known length of time, they went on to sundials, finger watches and finally the simple Braille watch, above, for blind men.

Although most of the timepieces on these pages were constructed mainly to make time (non-mechanical variety) with the ladies, watches serve a great many more useful purposes, too. Since the first watches were produced, men have been using them as emergency compasses: turn the hour hand to point to the sun, then halfway between that hand and 12 o'clock is South. •

MECHANIX ILLUSTRATED[®]

JULY

15^c



3 Million Volts Hit Car
See Story Page 66

CAN WITCHCRAFT KILL YOU?
26-Foot Motor Sailboat Anyone Can Build

mechanix illustrated

Title Registered U.S. Patent Office

july 1949

Cover photo by Westinghouse Electric Corporation

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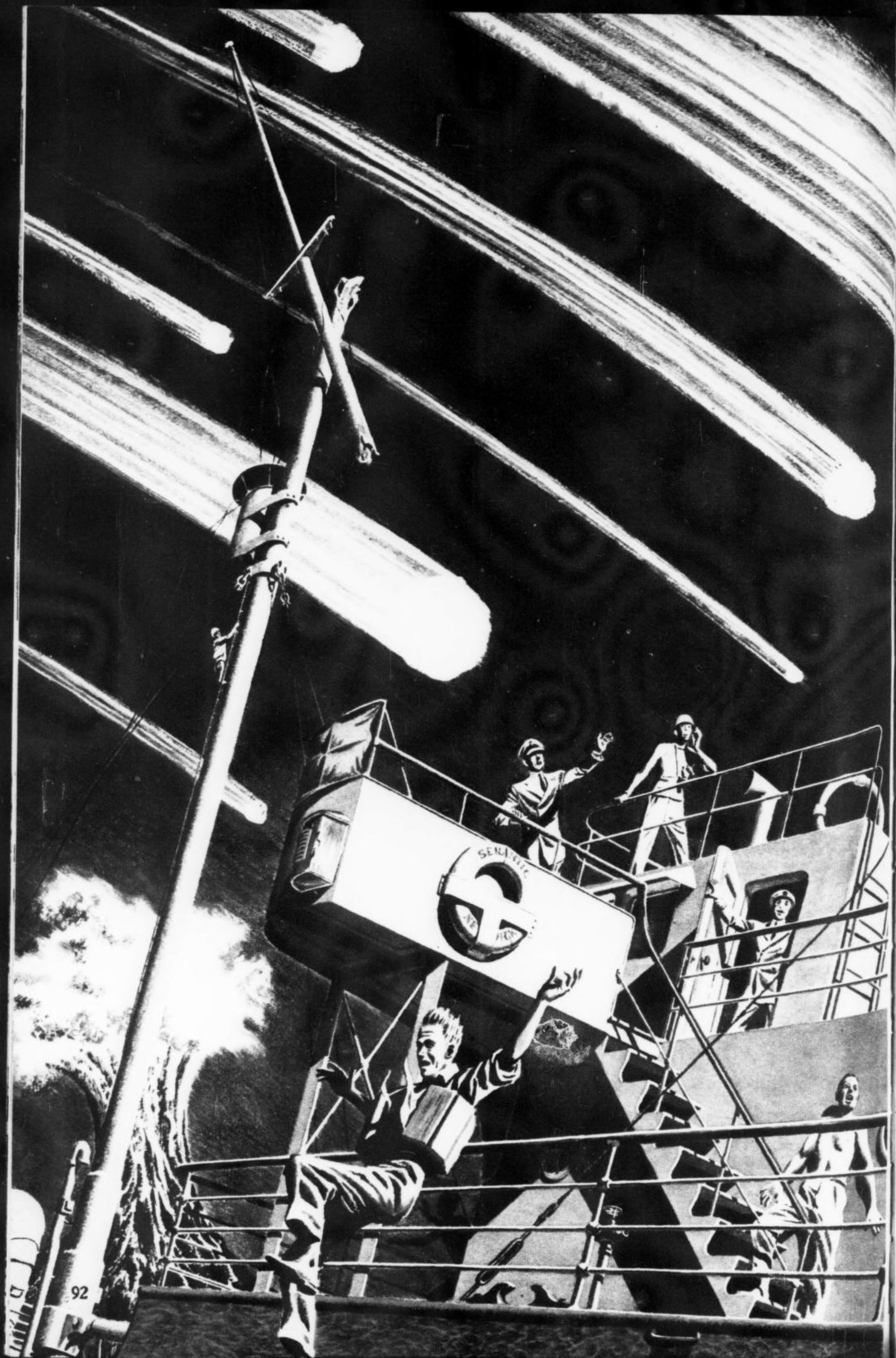
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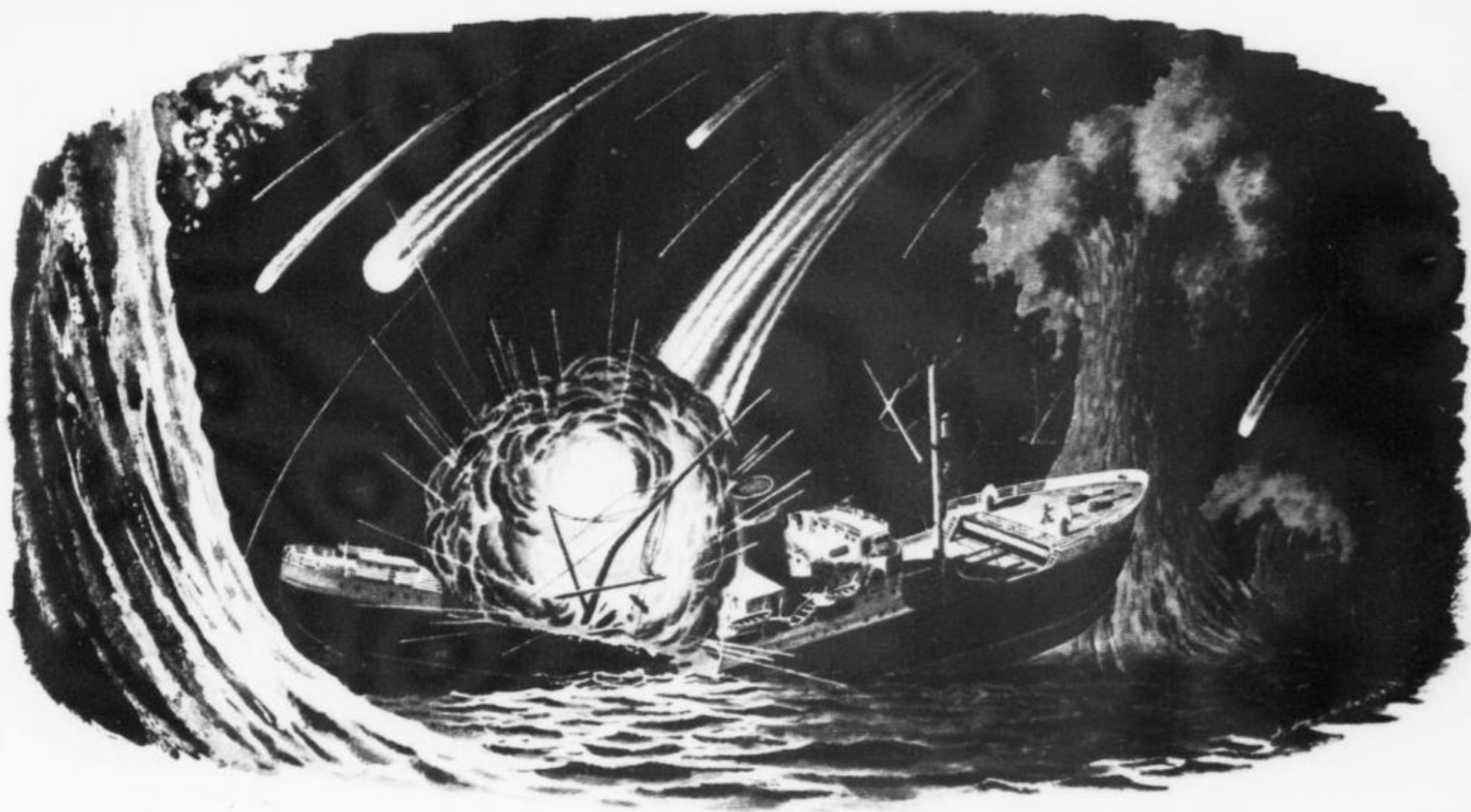
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Mechanix Illustrated





Can Science Solve SECRETS of VANISHING SHIPS?

By Lester David

"CAN you get through to New York?" The skipper spoke urgently into his radio man's ear as the ship creaked ominously in agony.

"I can hear 'em, but faintly," Sparks yelled back from the rattling wireless key.

Two living walls of speckled green rose on both sides of the Hopestar, 5260-ton British freighter 600 miles out of New York. The great foam-topped waves teetered mockingly to port and starboard, then smashed onto the deck. The ship quivered in every beam.

"Send the SOS—keep sending it as long as you can!" the skipper shouted.

New York heard the distress signal several times before it faded. The U. S. Coast Guard and the Royal Canadian Air Force scoured the sea relentlessly for months

after this desperate radio call for help last Nov. 21. But the hunt has been fruitless. And that SOS was the last the world has ever heard from the Hopestar and its 37 officers and men.

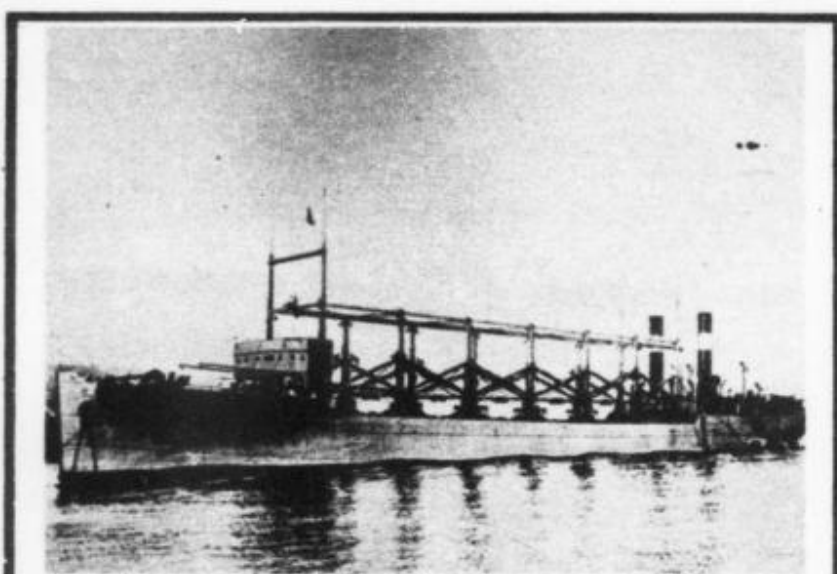
This spring the Coast Guard was searching for the answer to an even more sensational mystery of the sea—a strange new "Flying Dutchman" sighted some 70 miles east of Charleston, S. C. The tanker Richard J. Cleveland, ploughing through heavy seas at noon, spotted a two-masted schooner yawing back and forth before the wind and rolled off course to investigate.

As the tanker drew alongside, she blasted her whistle but found no sign of life aboard the schooner. The sails were torn and two of the jibs were trailing through the waves. The crew could not have left by lifeboat, since the vessel's sole dinghy was still

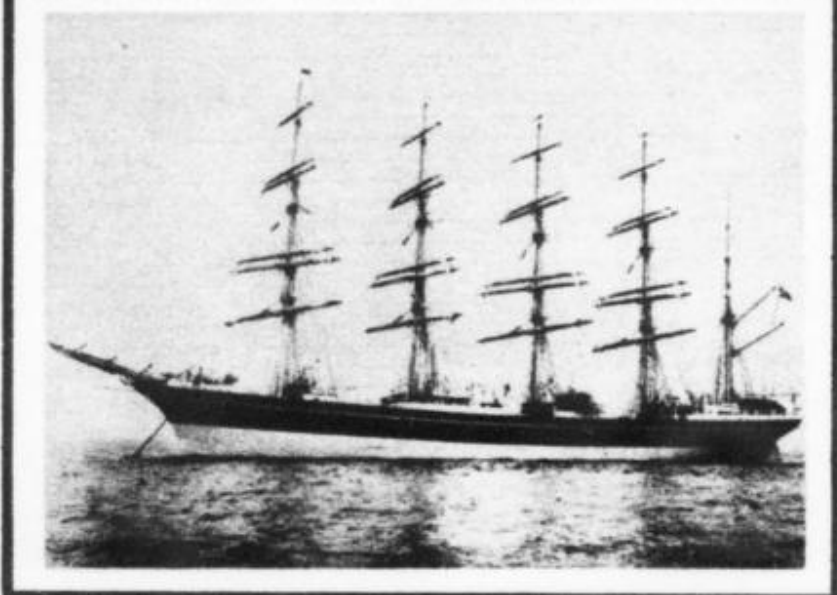
Flaming meteors may rain sudden disaster on a ship, as above—creating a new mystery of the sea.

Is the hulk-strewn Sargasso Sea, pictured below, a myth or actually a real Port of Missing Ships?





The Cyclops, 19,300-ton collier shown above, sailed from the West Indies—and the world—in March, 1918. The Kobenhavn, below, vanished on New Year's Day, 1929, with 60 lads.



lashed firmly on deck. The ghost ship was painted white but there was no trace of a name on her clean hull.

Before leaving the mysterious schooner, the tanker radioed Coast Guard headquarters a report on the derelict ship and gave the position of the sighting.

The next dawn, planes and ships launched a frantic hunt for the ghost schooner. Word from Hadley Parrot of Baltimore indicated that the derelict might be the Keewatin, reported missing with his brother Donald and Donald's family aboard, after sailing from Nassau in the British West Indies for Cape Charles, Va., April 1. The intensive search was spurred by the belief that the Baltimore couple had locked their two little children below deck during rough weather and that the youngsters might be trapped alive in the deserted ship.

After an exhaustive hunt by 29 aircraft, four cutters and two minesweepers, a Coast Guard amphibian plane discovered the missing schooner Keewatin in a tiny bay on Little Abaco Island in the British West Indies—with the babies and all hands safely aboard.

Later, the "Flying Dutchman" itself finally eased into port at Wilmington, N. C., and turned out to be the Windfall, a ship of

approximately the same size as the Keewatin.

And where was the crew of the Windfall when the Cleveland found her deserted and adrift on the high-rolling sea? Below deck, the skipper admits—all too miserably sick from that rolling sea to heed the tanker's blasts!

Seasickness that felled even the skipper was the surprising secret of the front-page "Flying Dutchman." But seasickness won't solve the case of the vanished Hopestar or the many other mystery ships that went down to sea and suddenly sailed out of the world forever.

Ships sailing chartered lanes have been sighted or contacted one day—and gone the next. Long, intense searches, sometimes lasting for years, have failed to reveal any clue to the baffling disappearance of these ships. Practically every country that ever registered a vessel has a representative in the great Ghost Fleet.

Some of the sea mysteries date back for centuries, others happened within the year. In the last 300 years, more than 200 ships, with crews totaling nearly 5000 have vanished from the seas and the sight of man. This total represents only recorded vessels. Maritime experts venture the opinion that countless hundreds of other ships and many more thousands of officers and men have disappeared in centuries past.

The majority of the older missing ships were lost when sailing was a high adventure, when marine instruments were crude and every sea a perilous one. They are not, therefore, written down as true mysteries. But the others are still unsolved secrets of the sea.

The first and most obvious explanation of these mysteries is that dread phrase for seamen, *storm at sea*. Some of the vessels undoubtedly encountered sudden and violent hurricanes, causing them to founder with all on board. Even the sturdiest vessel has a hard time in a big blow. Many of these lost ships, constructed before marine engineering became a fine art, were top heavy and had excessive rolls or permanent lists. Such ships might easily turn turtle when lashed by winds and waves. In others, the cargo may have been stowed improperly. Sudden shifting of a bulky cargo could wreck the ship and send it plummeting down into the deep.

There have been other explanations advanced, stranger ones indeed. Sea monsters took 'em, some old salts say. Most people scoff, of course, and dismiss the sea-monster solution as a whopping fine story. But some seamen shake their heads dourly and ask:

"Aren't there bones of prehistoric land monsters in the museums? Doesn't this mean that land monsters existed? Well, why couldn't sea monsters exist?"

Descendants of some monster saurian, these sailors say, still lurk in the depths of the sea. From time to time, they float up to the surface. There, blind and bewildered by the light of day, they capsize ships with a mighty swipe of their bodies. Many ships have returned from voyages, their crews swearing loudly that they saw such a sea monster.

And then there is the theory of the Sargasso Sea. Actually, that isn't a sea at all and, whatever it is, may not even exist. Partly fact and the large remainder a complex of myth and sailors' imagination, the sea is supposed to be a vast tangle of wreckage and seaweed drifting with the wind and currents somewhere in the North Atlantic between the Caribbean and the Canary Islands. To be caught in this seaweed jungle is death to a vessel, the story goes. The ships are sucked to the bottom by the tangle of weeds and many battered hulks are supposed to float to the surface on occasion. Many of the answers to maritime mysteries can be found in the Sargasso Sea, the sailors say. But, so far, *science* hasn't found the answer to those mysteries in the Sargasso Sea story.

One of the most baffling of these mysteries was the eerie tale of the Marie Celeste, unmatched even in sea legend.

This is her story:

At 3 p. m. on Dec. 5, 1872, the bark Dei Gratia was dipping gracefully under a light north wind 300 miles off Gibraltar when her lookout spotted a ship dead ahead. The Dei Gratia, an American vessel, signalled a greeting but got no response.

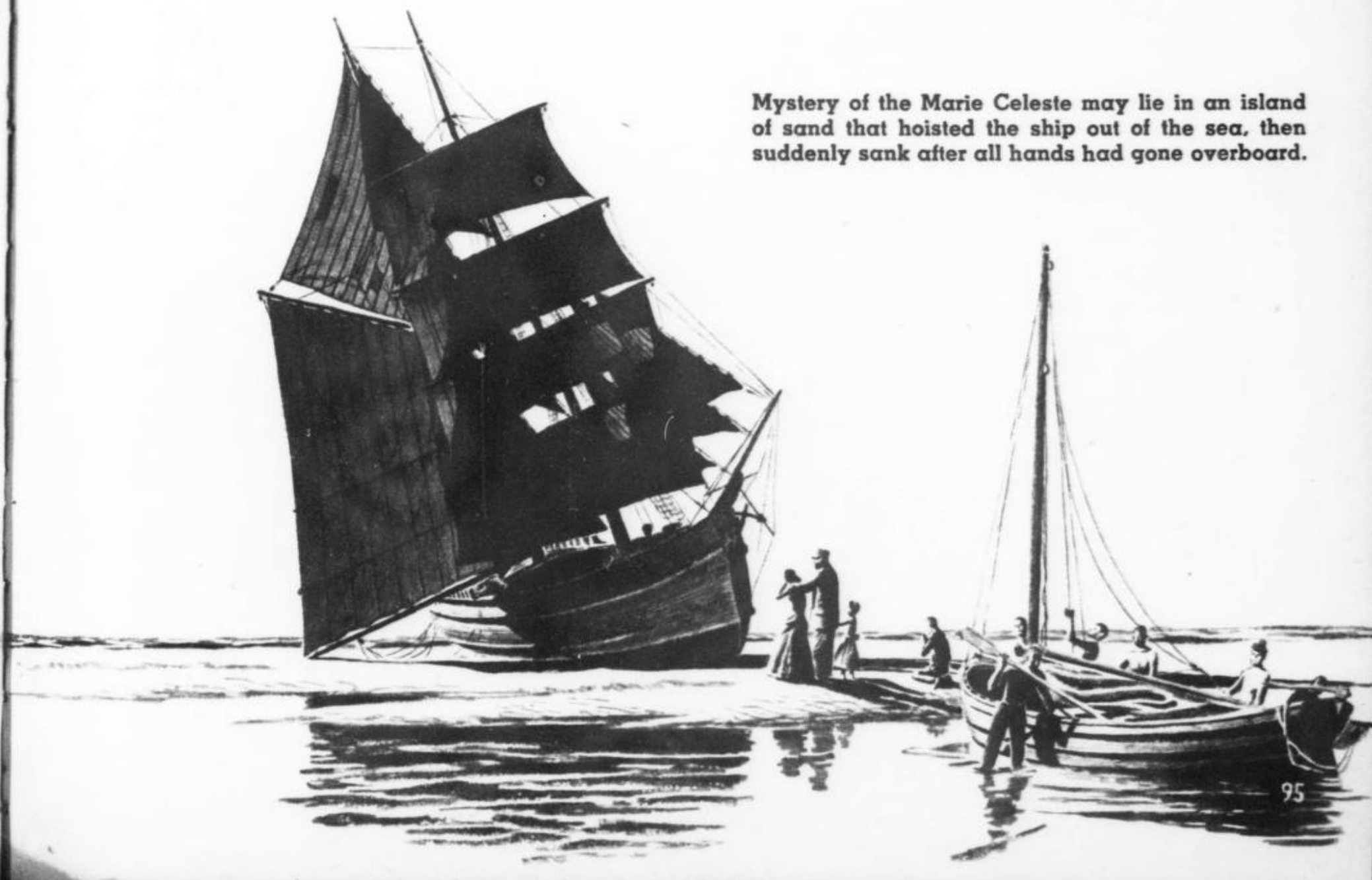
Strange, thought Captain Edward Morehouse, skipper of the Dei Gratia. Perhaps the master of the other ship had not learned his sea manners. The Dei Gratia drew nearer. Morehouse, watching through his glasses, noticed that the ship was staggering aimlessly before the wind.

The Dei Gratia drew opposite, noted the name painted on her bow: Marie Celeste, New York. Morehouse gave the Celeste an urgent hoist, a maritime signal calling for an immediate reply. But no reply came. Alarmed, Morehouse ordered a boat lowered. The captain, his first mate and several of his crew boarded the craft—and found not a soul aboard.

But the mystery grew deeper. In the forecastle, seamen's clothes were neatly hung and an open razor lay near a washbasin full of water. In the galley were the ashes of a burnt-out fire. On a table were the remains of breakfast that had been eaten by ten men.

The table in the captain's cabin was neatly laid for breakfast. A few spoonfuls of cereal remained in one of the plates and the top of an egg had been sliced off. Three chairs, two large [Continued on page 140]

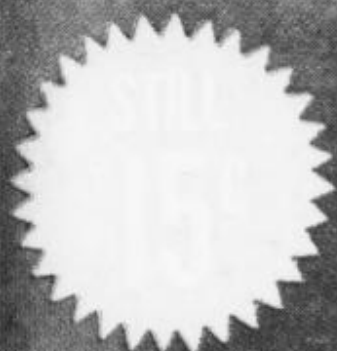
Mystery of the Marie Celeste may lie in an island of sand that hoisted the ship out of the sea, then suddenly sank after all hands had gone overboard.



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A Fawcett Magazine

DECEMBER



MAKE THESE ORIGINAL
CHRISTMAS TOYS
See Page 82



"DDT"—HOW TO USE IT

MECHANIX ILLUSTRATED

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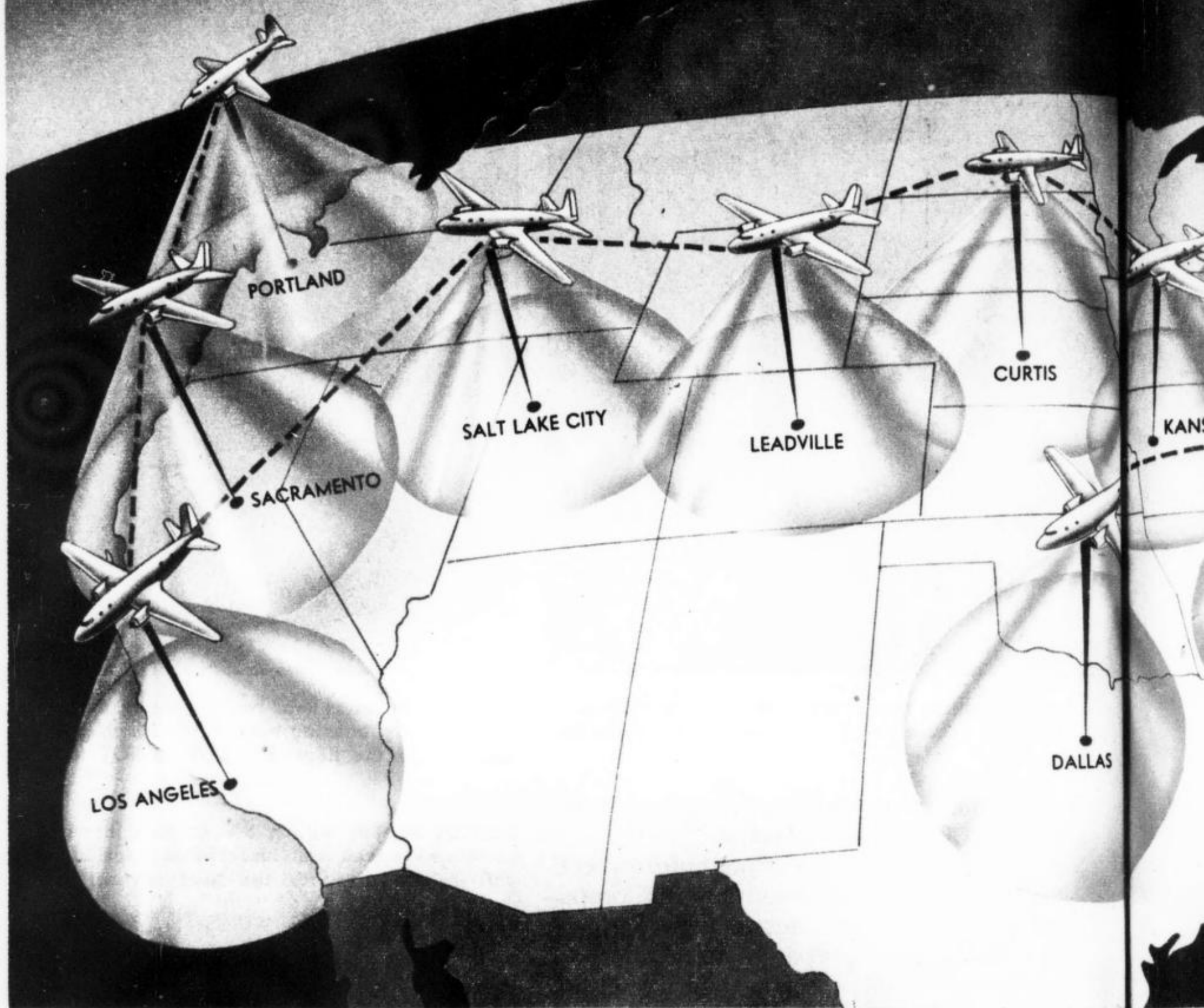
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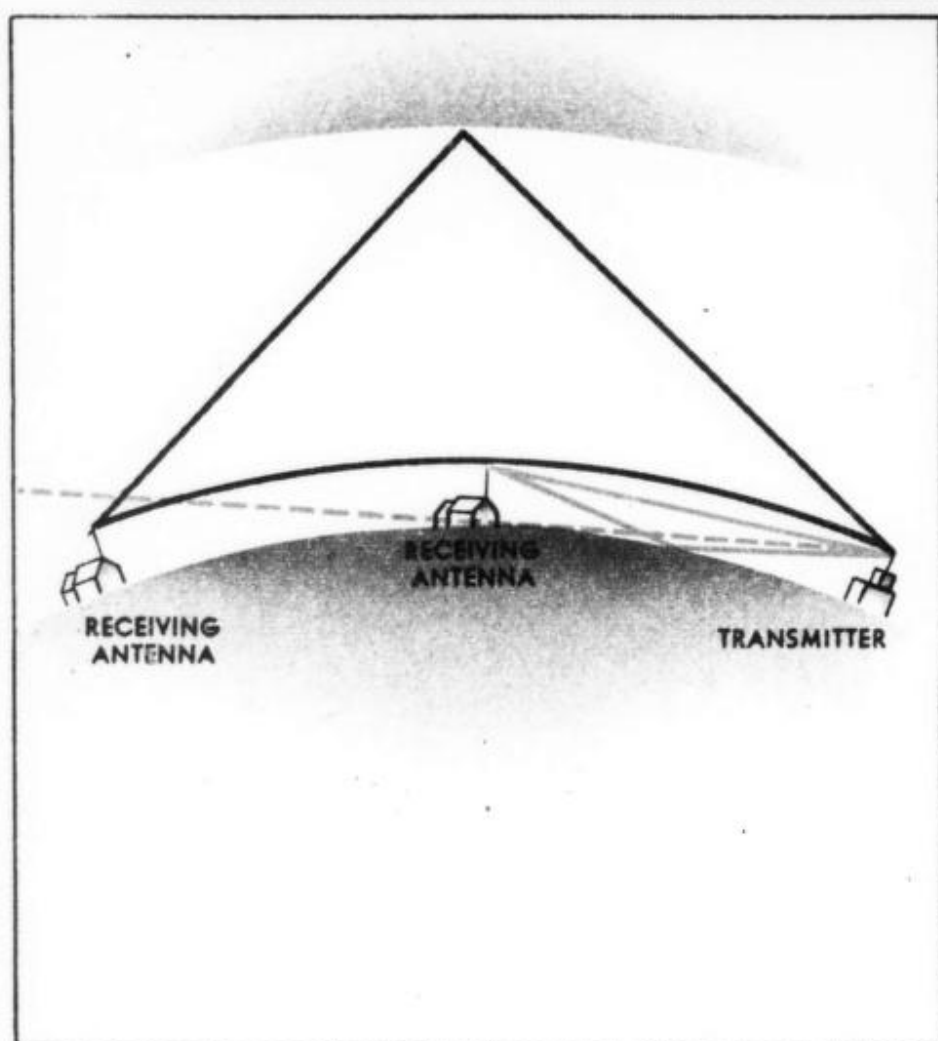
Video programs, televised from the cities named to planes hovering at 30,000 feet, will be beamed from the planes to areas where 78% of the population lives.

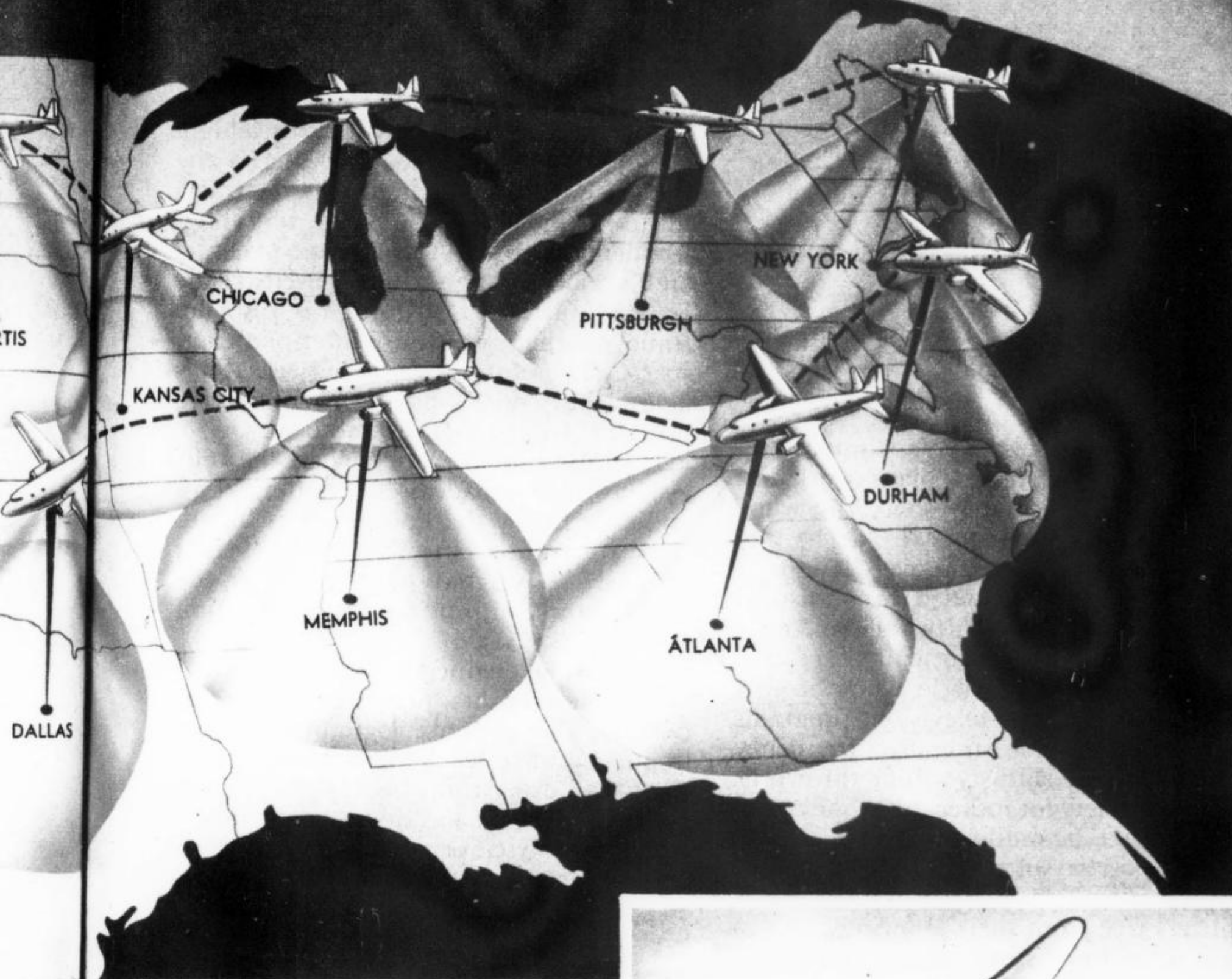
TELEVISION ON WINGS

14 Superfortresses spaced across continent will beam television to 4 of 5 in U. S.

Types of broadcasting transmission: Top line is standard low frequency; curved line is international short wave; red lines, ultra-high-frequency—television and FM.

Mechanix Illustrated

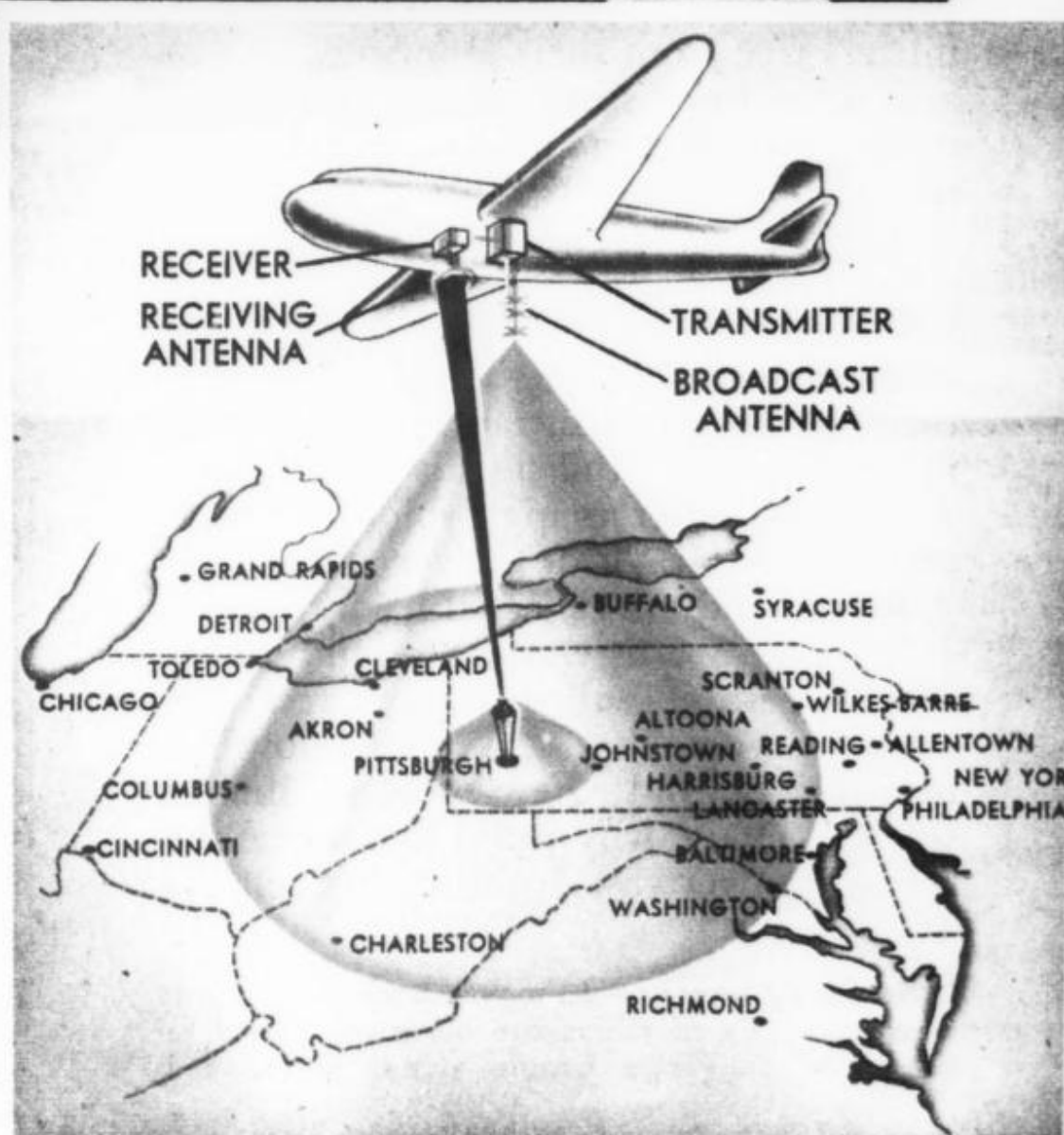


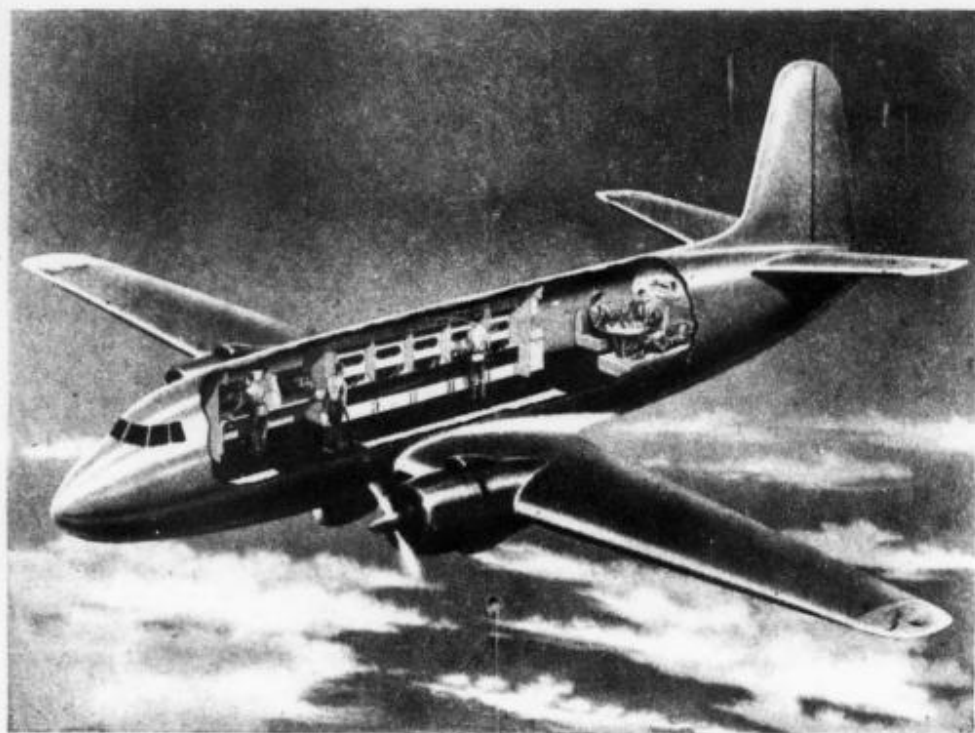


YOU'LL soon be bombarded with television programs—from stations in the stratosphere! Tomorrow's video broadcasts will be flashed to you, not from lofty mountain peaks or skyscraper summits, but from 30,000 or 40,000 feet up, and they'll be called Strato-vision. Better add that term to your vocabulary right now. Slated to become as much of a household word as a breakfast cereal, it means television shot into the stratosphere and beamed down to you from a B-29.

One Strato-vision plane would serve an area of about 103,000 square miles, or about the combined area of New York State, Pennsylvania and New Jersey.

December, 1945





Almost as big as the B-29 but only 1/3 its weight, the Stratovision plane has two 1,450-h.p. engines.

The airborne transmitter, nerve-center of Stratovision, is not an impractical dream. When present plans work out, which should be fairly soon, the whole country will be spanned by a chain of Superfortresses hovering over designated zones and flashing video broadcasts to areas where live four-fifths of the American people. Each plane will be capable of covering a huge circle below it with four simultaneous television programs, and, for good measure, five frequency-modulation broadcasts will be thrown in, plus a variety of other ultra-shortwave services like facsimile.

For a variety of reasons, it's a blessing to telecasters to pry landlocked transmitters free from their moorings. Standard radio, to be sure, doesn't give a hoot if its transmitters are stationary and firmly-rooted installations, practically flush with the earth's surface. That's because its stock-in-trade is the standard low-frequency wave, which, being obligingly malleable, bends to follow the curvature of the earth's surface. Also, at such low frequencies, the signals that zip upwards encounter a highly ionized layer called the Heaviside Layer about 100 miles up, and are reflected back to earth.

In other words, both "ground wave" and "sky wave" will speed to a receiving set even when that set is far below the horizon, beyond the sender's "line-of-sight." That's why radio and telegraph reception over vast distances is a relative

Chart shows how horizon moves back as height is increased. As antennas are elevated, power required to deliver a usable signal is reduced.

Art work adapted from Westinghouse Stratovision

cinch. You can be completely hidden from the receiver's view, with half the globe humping up between you and that receiver, and still bombard its antenna with radio and international short-wave broadcasts.

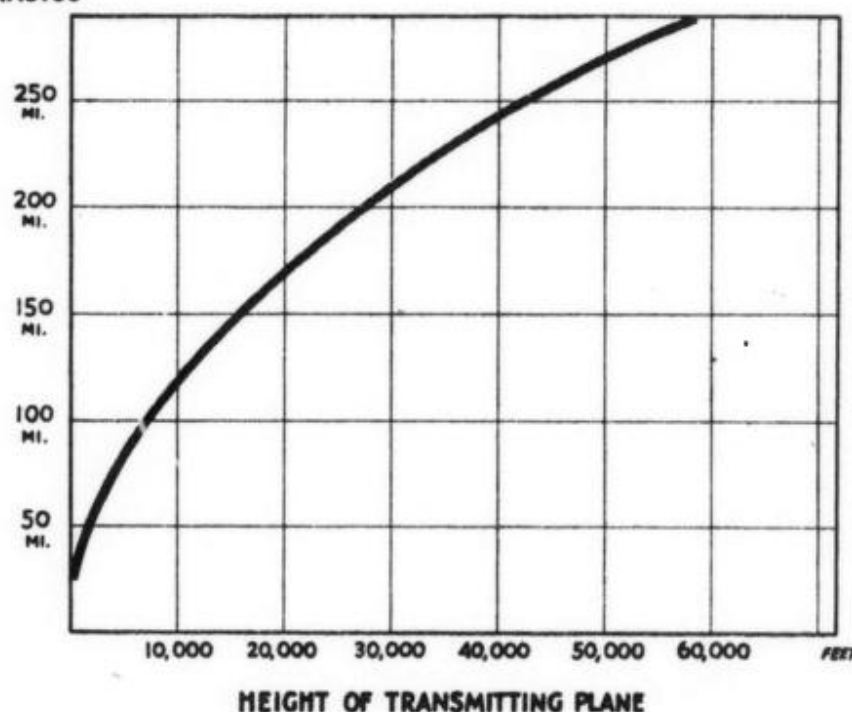
But in television and frequency-modulation you're dealing with ultra-high-frequency broadcasting, and there's the rub, if you've got a ground-hugging transmitter. For when you have very high frequencies, ground waves refuse to curve, and sky waves, ignoring the Heaviside Layer, punch a path through it and continue on their way into inter-planetary space. Therefore, a receiving set, if it's below the sender's horizon, will receive no signal from either ground or sky.

It's the same sad story when the television or FM broadcaster is aiming at an audience below the horizon. His broadcasts are limited strictly to line-of-sight distances. His signals will skim across the horizon and continue out in the direction of the Milky Way.

Television engineers have spent a lot of sleepless nights juggling this brain-twister. The perverse logic of the high-frequency wave leads them smack into a stone wall every time, because, even with the best antenna locations (atop mountains and skyscrapers), they know that high-powered television and FM stations on the ground can't service a radius much beyond 50 miles.

So far, in their effort to cope with the high-frequency wave's unswerving disdain for dips, detours and deflections, engineers have [Continued on page 60]

BROADCAST SERVICE RADIUS



Something New on the Wing



Predecessor of the latest model is the Burnelli CBY-3 cargo and transport plane above.

A new adaptation of the famous flying wing aircraft is the "lifting fuselage" type now undergoing initial flight tests.

BY GEORGE DANIELS

PREDECESSOR of a line of super cargo and passenger air liners, the newest of the giant Burnelli lifting-fuselage ships is now being test flown at the airport of the Canadian Car & Foundry. Of modified flying wing design, it is one of the roomiest airplanes of its size ever built, and also one of the safest and fastest for the area and horsepower.

Unlike any previous airliner, the 40-passenger Burnelli can be flown as a two-control ship, or even with both rudder and aileron controls locked. Still more incredible, an earlier model, of the type used by Gen. Charles De Gaulle, has actually been flown repeatedly in England without using rudder, ailerons or elevators; control was maintained solely by

the flap at the trailing edge of the wing-like fuselage, and by the use of engine power for directional effect.

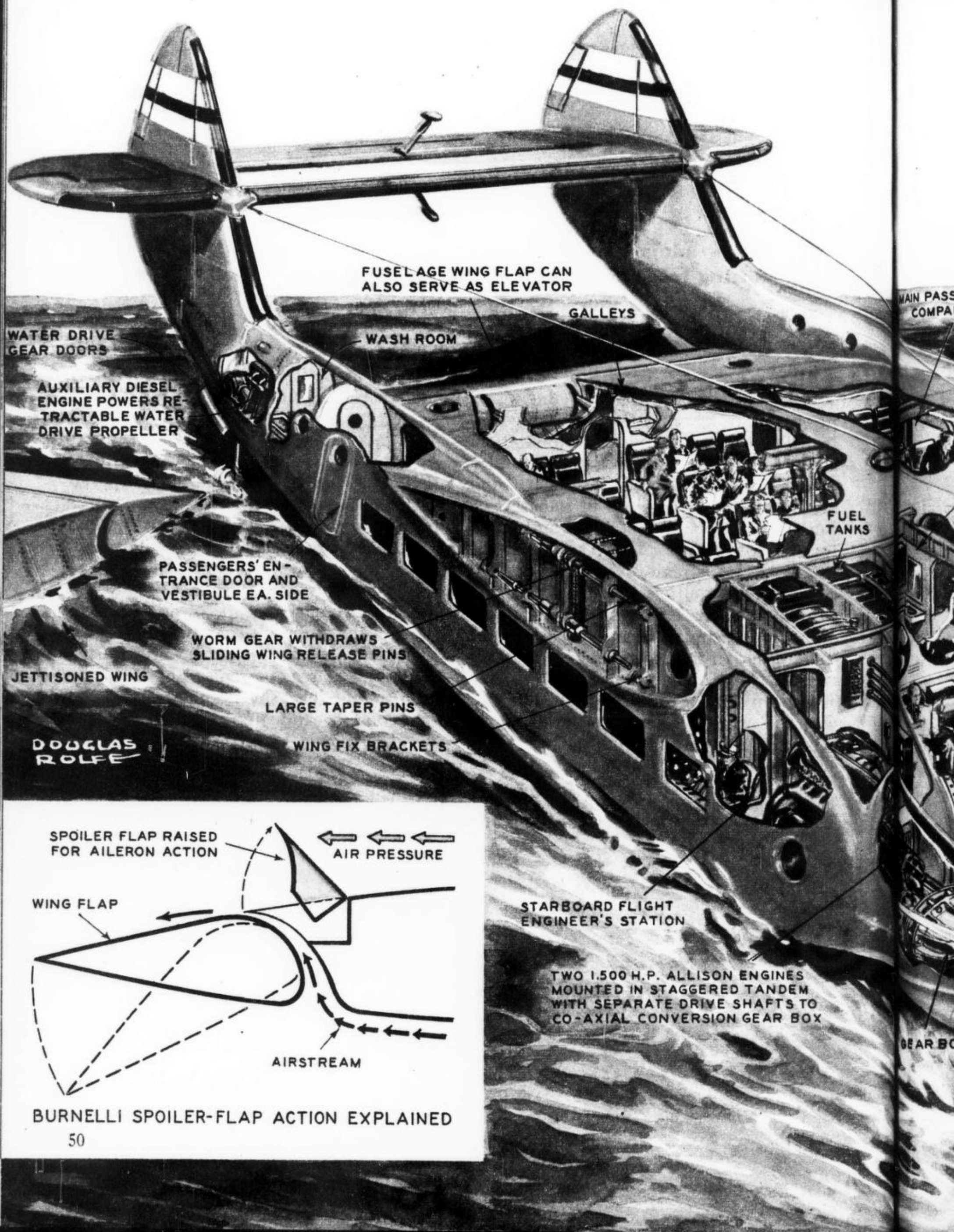
In addition to their hitherto unapproached stability, 80 passenger ships of the new 1946 design, as well as special models of those now coming from the production line, are designed to descend on the water with complete safety and travel for days under their own power as full-fledged sea-going boats. This feat is the more remarkable in consideration of the fact that they are strictly land planes.

Under any circumstances necessitating a landing at sea, passengers of this type of ultra modern sky hotel lose none of the comfort and luxury that they enjoyed in the air. [Continued on page 157]

Recent photo of CBY-3 shows its wing-like fuselage which contributes 70% of lift. Plane has proved so stable that it can be flown by flaps alone. (See drawings on following pages.)

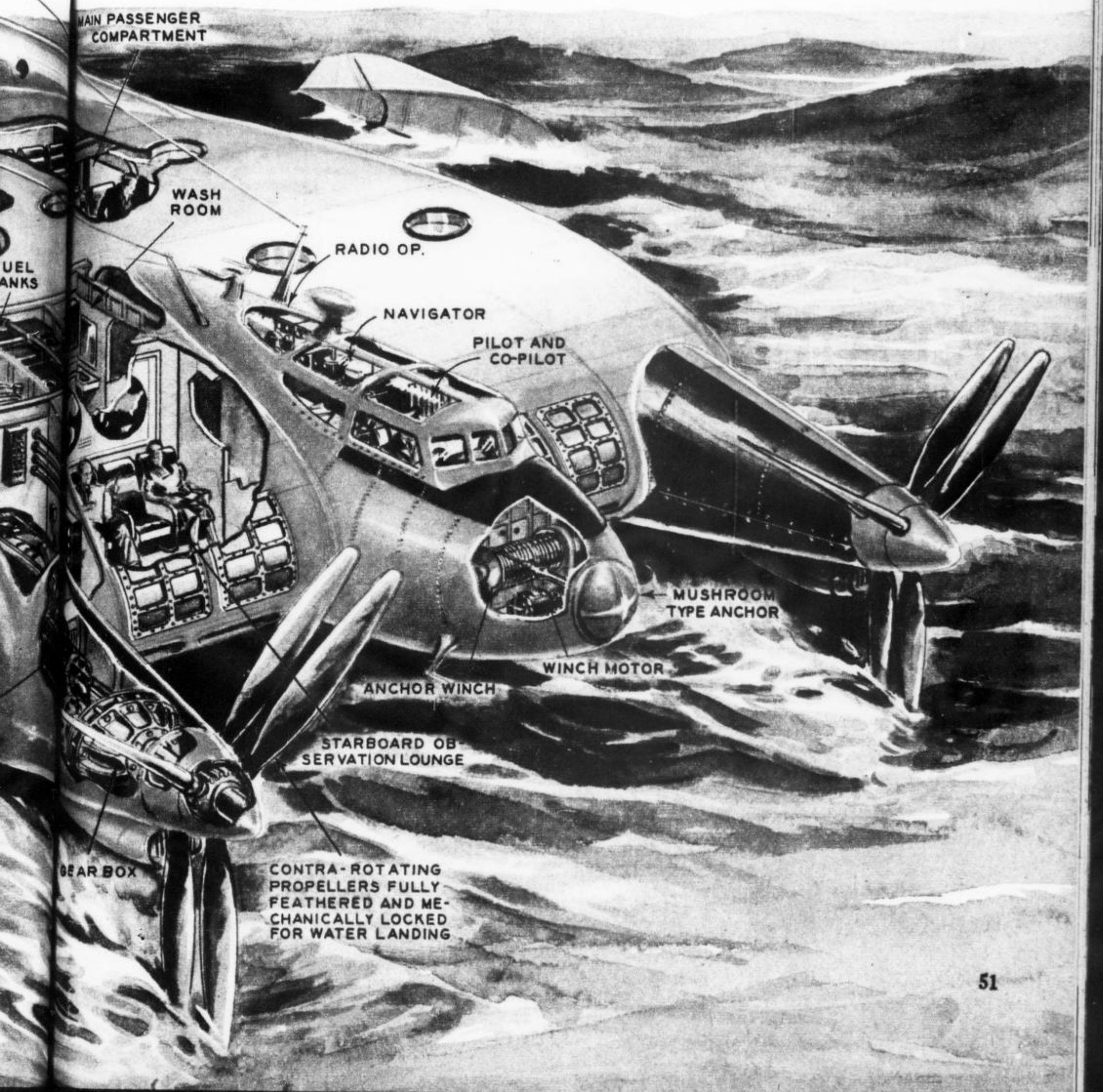


In case of a forced landing at sea, the new Burnelli plane conveniently discards its no longer useful wings, and proceeds by water, driven by its diesel-powered underwater propellers.





SPOILER TYPE RE-TRACTABLE AILERONS



MECHANIX ILLUSTRATED

A Fawcett Magazine

MAY

STILL
15^c

*Johnson Rocket
185 MPH Lightplane
See Page 66*

ATOM BOMBING THE POLAR ICE
COLOR GOES TO WORK

MECHANIX ILLUSTRATED

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W. H. FAWCETT Jr.
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Larry Eisinger.....Crafts & Hobbies
Robert BrightmanPhotography
Jo McCallionProduction

MAY, 1946

VOL. XXXVI NO. 1

On the cover: Johnson Rocket 185 mph. lightplane

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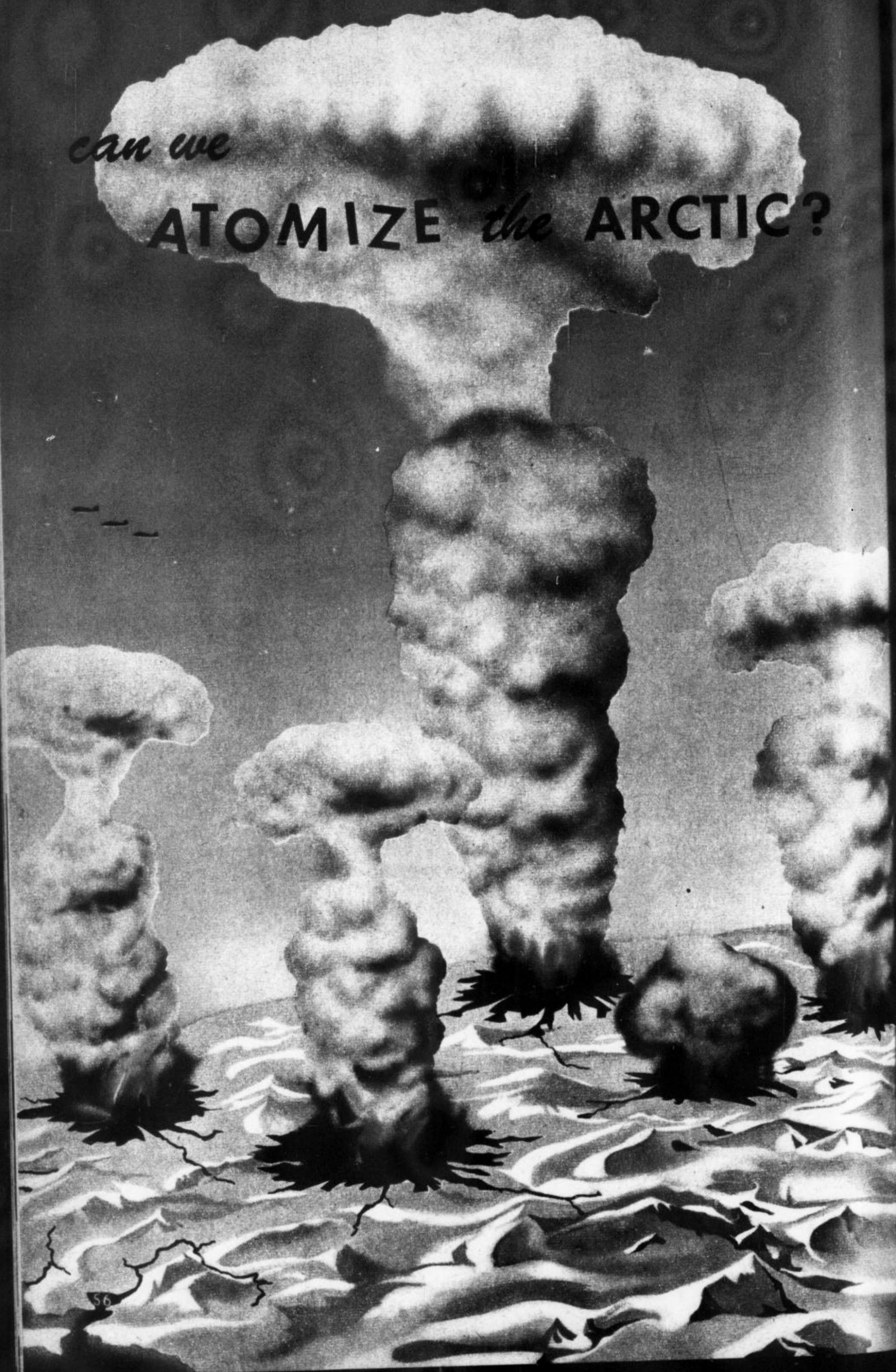
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MEMBER AUDIT BUREAU OF CIRCULATIONS

can we

ATOMIZE *the* **ARCTIC?**



Will the atomic bomb and UNO combine to make a world of beauty and industry out of what is now but frozen waste?

BY WALLACE W. ASHLEY AND ELMER V. SWAN

"EVERYBODY talks about the weather but nobody does anything about it." So quipped Mark Twain, with perfect truth, in the years just before the dawn of the atomic era.

Now something *can* be done about the weather, however—by using atomic energy to perform a gigantic "defrosting" operation on old Mother Earth's northern refrigerator. Professor Julian Huxley has mentioned this possibility, and touched off a discussion on the feasibility of such a project and its benefits to mankind.

Most of our weather comes directly out of the North. Eliminate or modify the influences that make that weather, and the climate of our entire northern hemisphere would undergo radical changes. Rid the polar region of the vast ice-sheet and you would remove the occasional "cold snaps" that freeze water pipes and tie up metropolitan transportation as far south as St. Louis and Washington.

The vast wastelands north of the Arctic

Circle would be opened up to mining and agriculture. Intercontinental airlines using intermediate refueling bases could fly the Great Circle route regularly. Warm-water ports, open the year round, could become a reality along Hudson Bay, Siberia's Arctic shores and the White Sea.

Can the Arctic ice be eliminated? Huxley believes this age-old dream of scientists and economists has come much closer to realization with the arrival of atomic energy. The terrific heat generated by nuclear fission would melt large areas of ice. A series of well-placed atomic blasts would cover an area great enough to make the results effective. Whether the "bombs" should be dropped from planes, as in the case of Hiroshima and Nagasaki, or whether towers should be constructed for remote control operation, as was done in the original test in the New Mexico desert, would be determined by a commission of scientists and economists.





The ice-cap of Taku, its winding glacier tongues coming down to sea level, may be changed by atomic energy into one of the garden spots of the world we know.

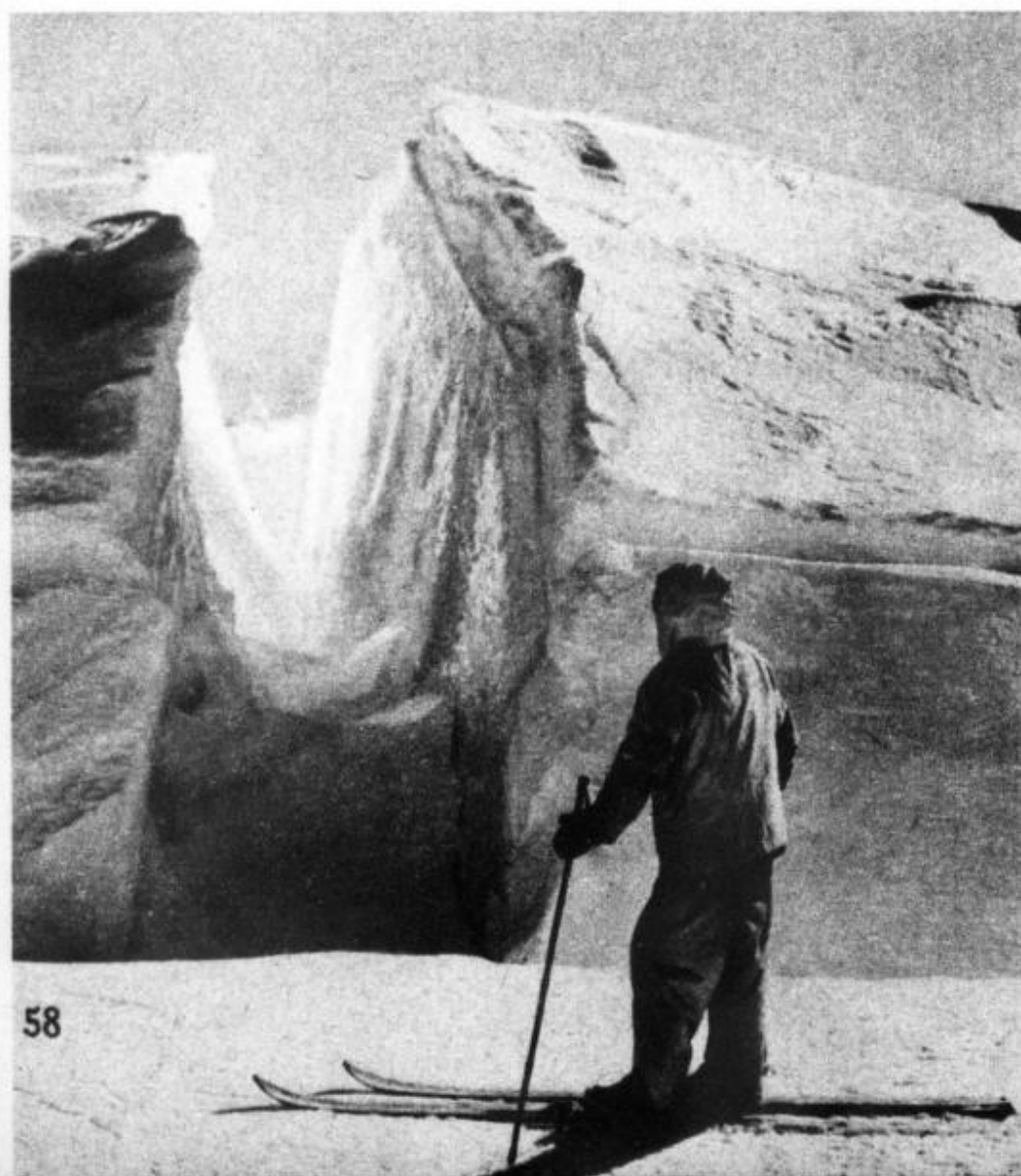
The area concerned is extensive. The greatest single expanse of ice-covered land north of the Arctic Circle is Greenland, the source of the icebergs that harass North Atlantic shipping during the winter and spring months. West of Greenland are numerous islands held fast in the grip of year-round ice. Northern Alaska is icebound months at a time. Upper Siberia is bitterly cold, as American seamen on the Murmansk run can attest.

Cartographers believe destruction of the ice-sheet would enable them to get

full data for the great uncharted areas now appearing only as white space on the Arctic map. It is an interesting fact that the center of the floating icepack is not at the North Pole, but at $83^{\circ}50'$ North Latitude and 160° West Longitude, about 430 miles below. This center is well named the Pole of Inaccessibility.

A simple computation will demonstrate that sufficient uranium is available for an Arctic de-icing project. Available also is the agency that could initiate and supervise it—the United Nations Organization. The burden of financing the work would be the obligation of all nations, since climatic benefits would be worldwide. The resultant change in the ocean's level would be felt slightly on every coastline around the globe, another reason for cooperation on an international basis. No accurate estimate can be made as to the cost involved, but many meteorologists agree the project would pay for itself many times over.

Once destroyed, the polar ice is not likely to accumulate again, since oceanographers assert that ice-sheets form only when each winter's [Continued on page 72]

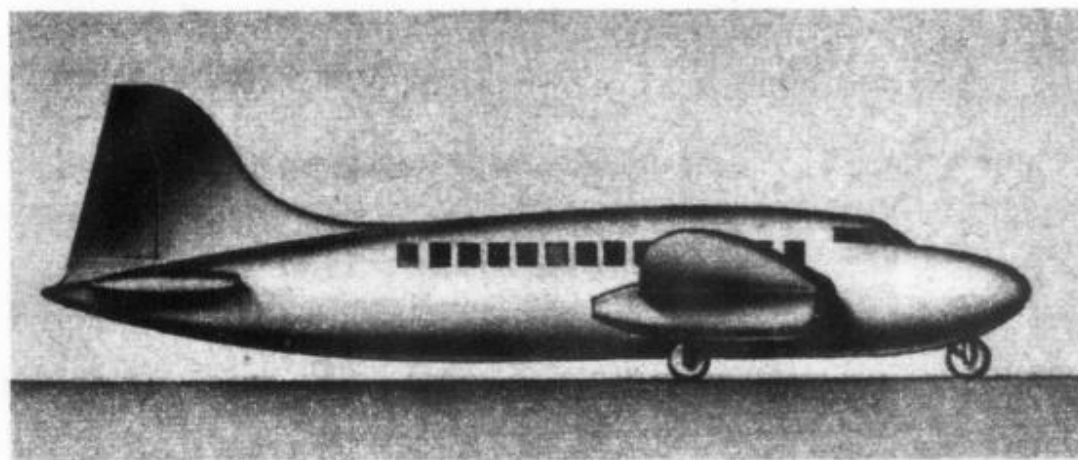


An arctic skier looks at frozen chasm which, with application of atomic force, may become a warm and verdant spot.

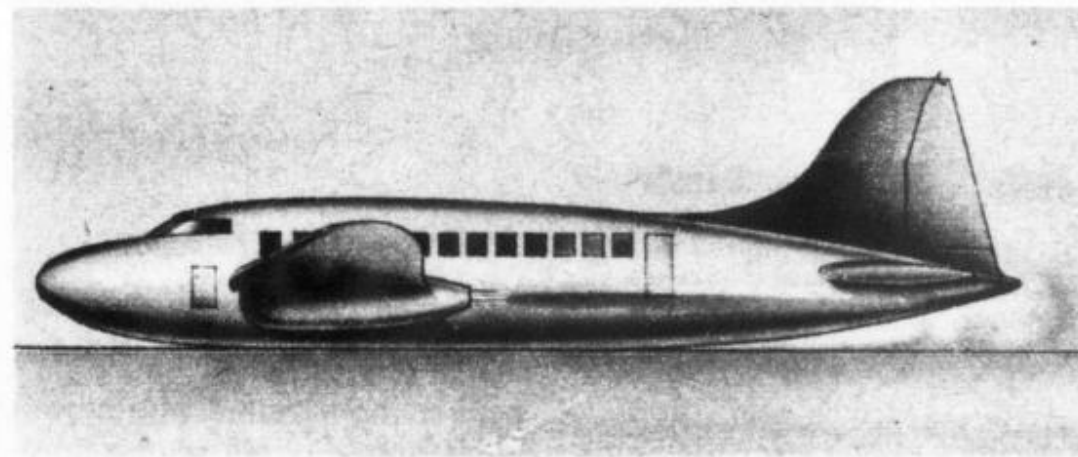
Mechanix Illustrated



The jet plane of tomorrow leaves the ground after achieving take-off speed on the launching sled which runs on tracks.



Upper picture shows the utility wheels which the jet plane would have for taxiing. Below, a "belly-whopper" landing.



Jet planes may land on their bellies and take off from a rocket launcher.

It is argued by a number of aeronautical experts that jet aircraft, needing no propeller clearance, can either shed its landing gear entirely or simply keep light utility wheels for ground handling. For take-offs, the wheels would be replaced by rocket sleds such as the one illustrated at the top of the page.

In landing, the plane will skid in on its belly and sled-nosed nacelles.

Such a system of landings and take-offs would save hundreds of pounds of useless weight that might then be turned to fuel or payload. Also, take-off distances would be shortened considerably.

MECHANIX ILLUSTRATED

MARCH

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*Republic Seabee
New Low-Priced
Amphibian*

FREE PATENTS FOR VETERANS
IN FULL COLOR FIREMEN OF THE SEA

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MARCH, 1946

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On the cover: Color photo of Republic Seabee
by Rudy Arnold

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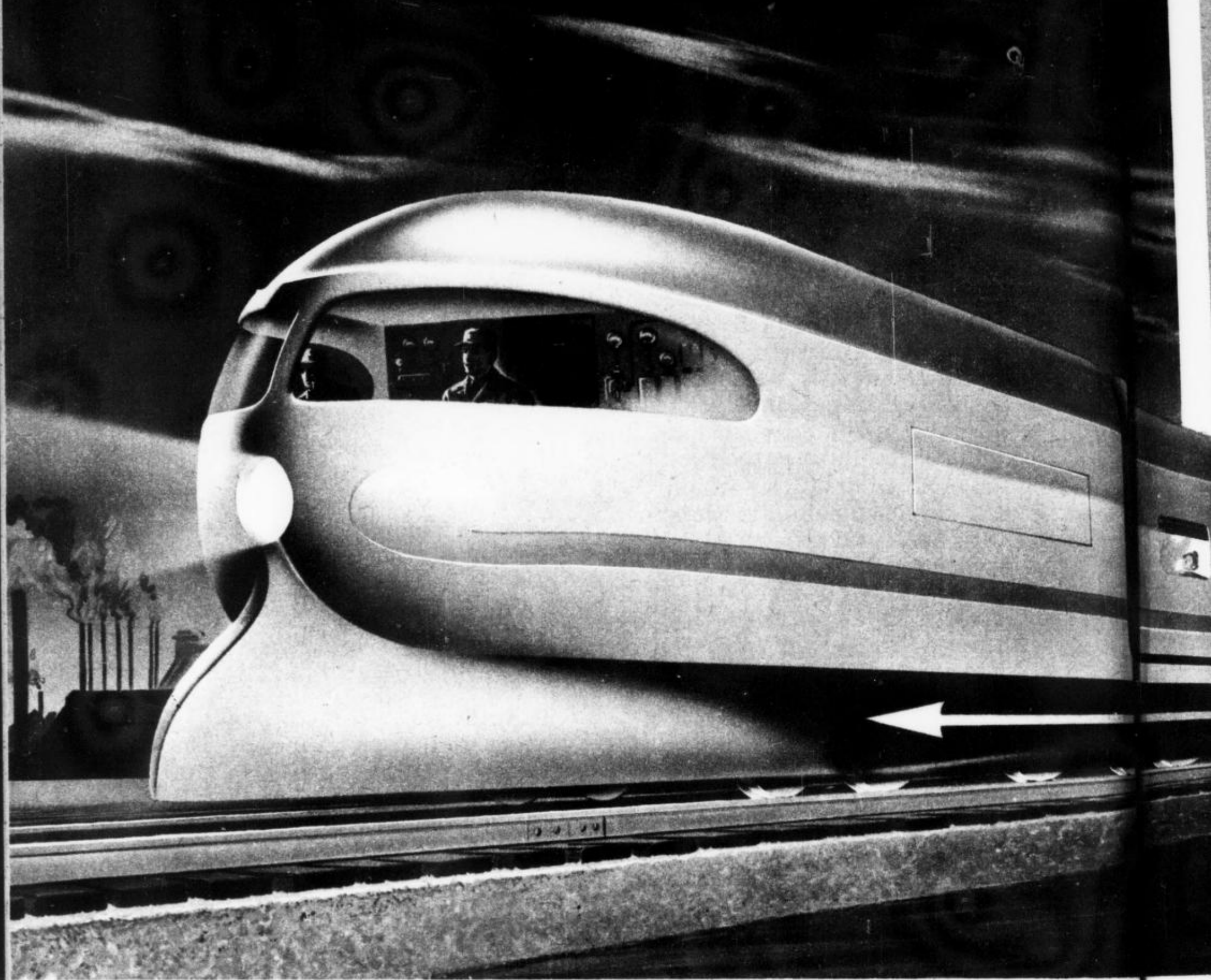
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ATOMIC ENGINES FOR PEACE

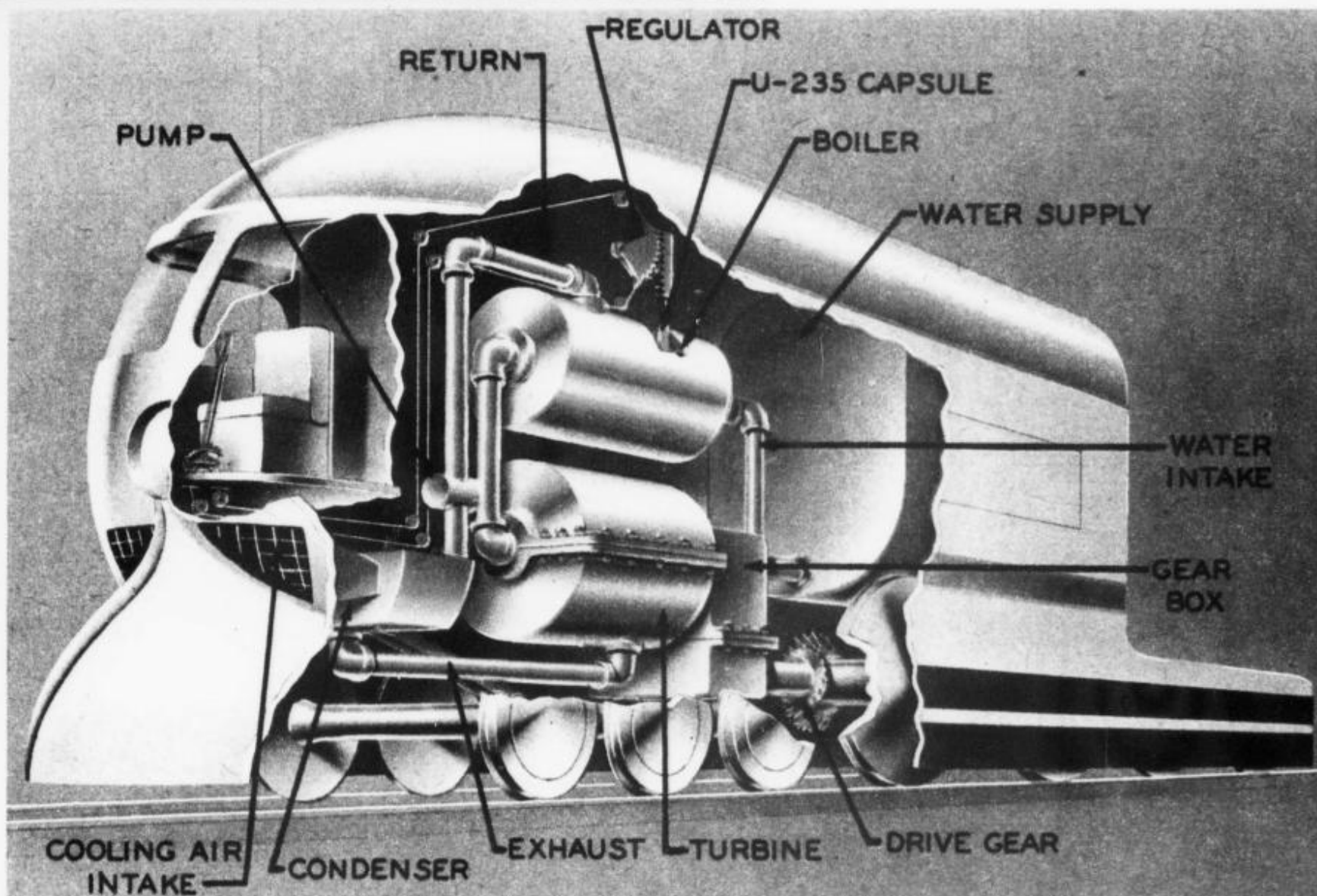
BY WILLY LEY



FOR a magnificent example of an atomic power plant we need only turn our eyes to the sun or any of the stars—but we won't find there any model for an atomic power plant of our own.

They may be considered models in the sense in which birds were models for the early inventors of airplanes. The birds demonstrated that flying was possible. But the birds' methods—and the stars' methods—can not be copied.

All suns operate with atomic transformations which involve the building up of heavier elements (helium) from lighter elements (hydrogen), but this requires temperatures of many millions of degrees. We cannot achieve such temperatures, and if we could, we could not handle them. Consequently our atomic power plants will have to operate at near-normal temperatures, or at least at such temperatures as we can handle. That limitation



The ideal train highballs ahead (left). Note how small and simple its atomic power plant is (above). All the enormous and almost inexhaustible energy is furnished by a small capsule of U-235.

Insert the little U-235 capsule, prime with a few neutrons, and whoosh! your turbine's a-humming and the world's streaking past.

in temperature limits our choice of atomic fuels to a very few elements at the opposite end of the atomic table. We have to use not the lightest, but the heaviest atoms. And although some building up of still heavier atoms is still possible, we will, in all probability, operate mostly by splitting large atoms into smaller ones.

The word "mostly" is significant; it will not be always and exclusively a splitting of large atoms. In some power plant op-

erations a building up will be used.

In fact we can state the case even now.

Very large and stationary power plants will mostly operate on the building-up principle. Small and mobile power plants will operate on the principle of splitting.

The first type of power plant exists right now and has been in operation for several years, though it was used not as a power plant but for the purpose of making the explosive for the atomic bomb.



One of the present most powerful diesel-electric locomotives in the world, recently christened at the Baldwin Eddystone plant.

I am speaking of the Uranium Pile.

Essentially the Uranium Pile is a reaction chamber into which slugs of Uranium are placed, spaced apart by slabs of graphite. When the nuclear reaction in the Uranium gets started, a large amount of heat is liberated constantly, so much heat that large quantities of cold water have to be provided for cooling. The cooling water becomes heated, of course, and may be used industrially wherever hot water will be of service.

But let's see what happens inside the Pile.

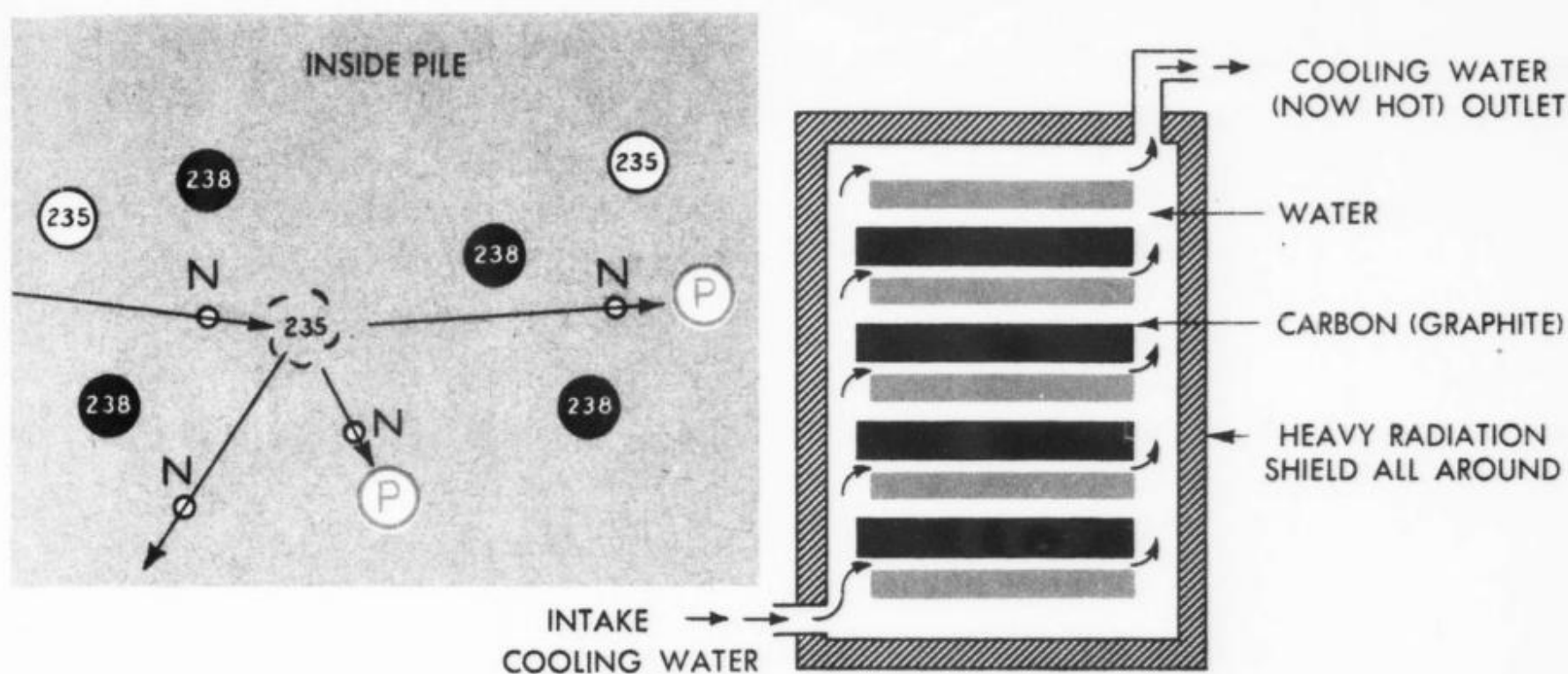
Uranium of the type U-238 is used, which has 92 positively charged protons and 146 electrically neutral neutrons in its nucleus; every 140th atom will be of the type U-235, with 92 protons and 143 neutrons. To start the reaction some neutrons are sent into the chamber. One of them will strike a U-235 nucleus and explode it, releasing four more neutrons. These new neutrons, slowed down by bouncing around between the carbon atoms of the graphite packing, will mostly be absorbed by U-238 atoms; but any that happens to hit one of the less numerous U-235 atoms will explode it and produce still more neutrons.

The U-238 atom which absorbs a neu-

tron becomes a U-239 atom; but it is not stable. In order to adjust its stability, one of the neutrons in such an atom (not necessarily the one that has been absorbed) throws out a negative electric charge called beta radiation. Once it does this, the neutron ceases to be "neutral," or even to remain a neutron; it becomes a positive proton. The atom, consequently, now has 93 protons and 146 neutrons in its nucleus. It has become element No. 93, still weighing 239 units. This process repeated, the atom becomes element No. 94, still weighing 239 units and called Plutonium-239. That was the explosive used in the bomb. The whole process amounts to using up U-238 in order to build the bigger Pu-239.

But some mass is destroyed in the building-up process, and that destroyed mass has to appear as energy, mostly heat. As far as is known the designers at Oak Ridge just got rid of their heat as fast as they could; they were not supposed to operate efficiently.

Some possible methods of using the heat are shown in the illustrations. The hot water could be used to heat boilers which then feed steam turbines which in turn drive electric generators. Or air could be heated and, in expanding, drive



U-235 atom, hit by neutron, explodes, releasing more neutrons. These are absorbed by U-238 atoms, which then change into Plutonium (left). Right, alternate slugs of Uranium (red) and graphite make Uranium pile.

a low-pressure hot-air turbine. Or the heat could be used directly for drying processes or for room heating or, in short, in any way in which heat can be used.

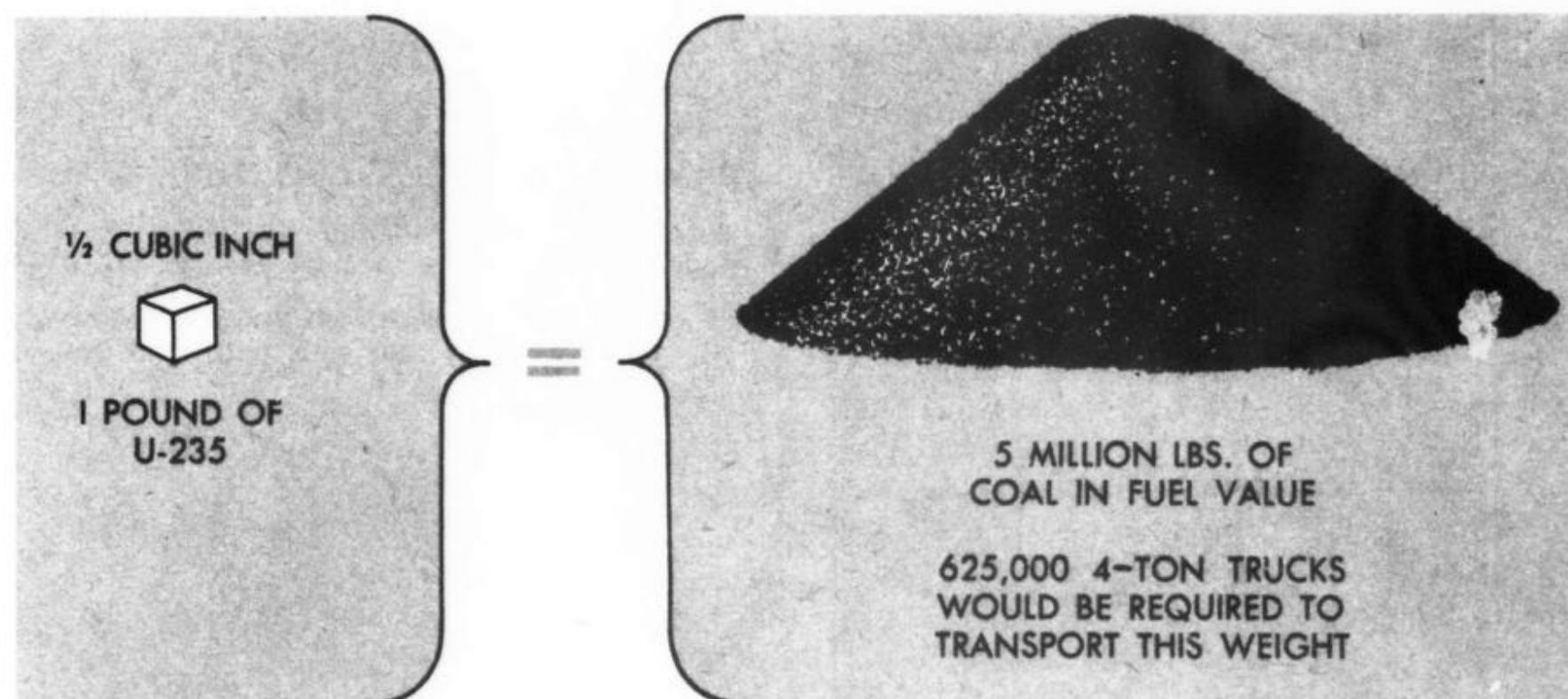
Power plants operating on this principle would, of course, have to be large and stationary.

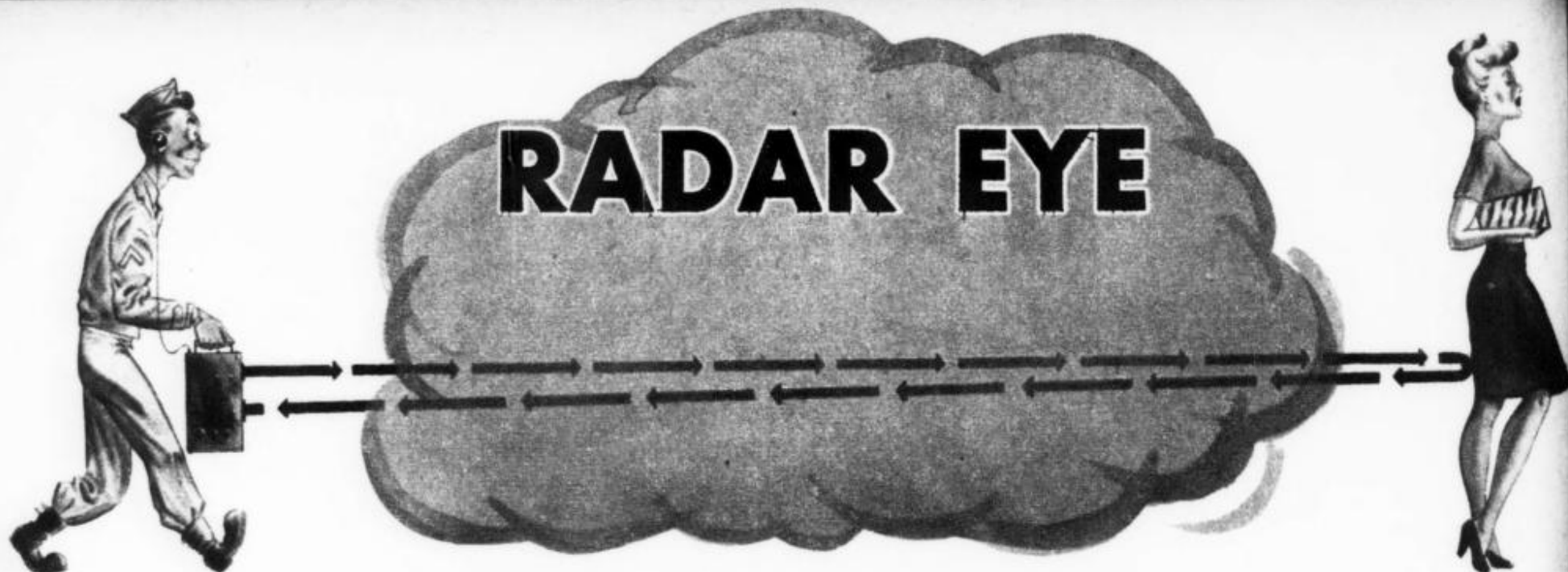
An interesting point here is that the operation of such power plants would not actually "use" atomic energy in the sense in which we say that another plant uses oil or uses coal. The heat is merely a by-product obtained when *making* high grade atomic fuels, like U-235 and Plutonium. What is actually used up is the relatively cheap and abundant U-238, the ordinary Uranium for which there never was any other use than putting it into glass and ceramics as a coloring material.

In the other type of atomic power plant,

the type which "burns" U-235, the picture is reversed, for the U-235 is actually destroyed. What happens here is this: one U-235 atom is exploded by a neutron and emits four more neutrons which are then slowed down in water or graphite—so far all in the customary manner. But the new slow neutrons are not absorbed by U-238 atoms, since there are none of them around (or only a very few). They can only go into other U-235 atoms and explode them in turn. And so on. The process corresponds exactly with fuel burning, where a little fuel is burned in order to raise more and more of the fuel to the temperature at which it will burn.

The industrial product of the second type of power plant would also be heat, and a capsule of U-235 would have the characteristics [Continued on page 79]





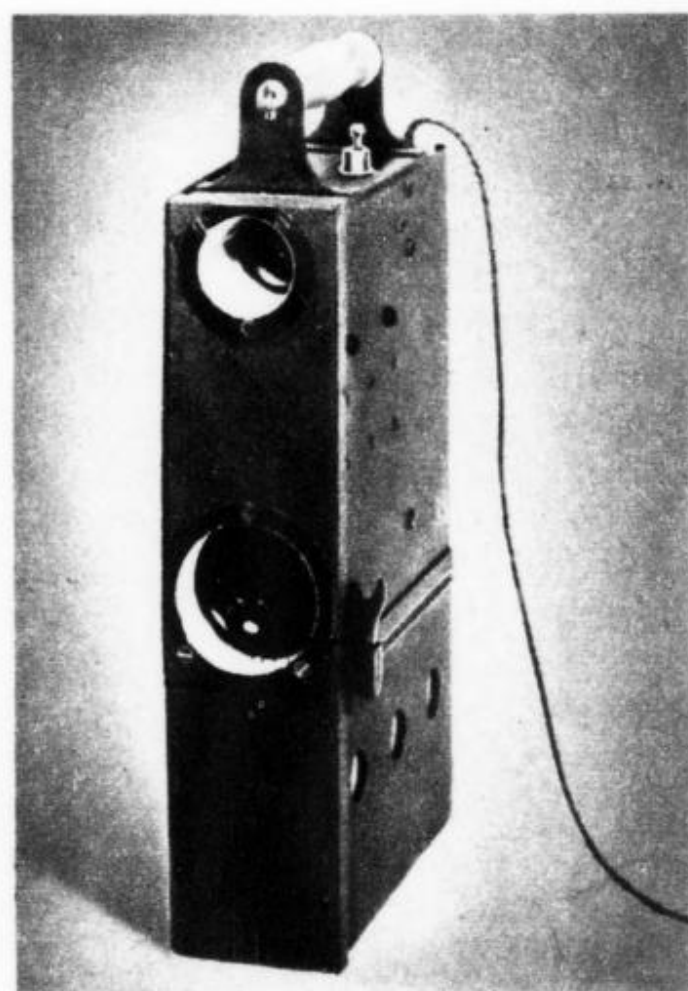
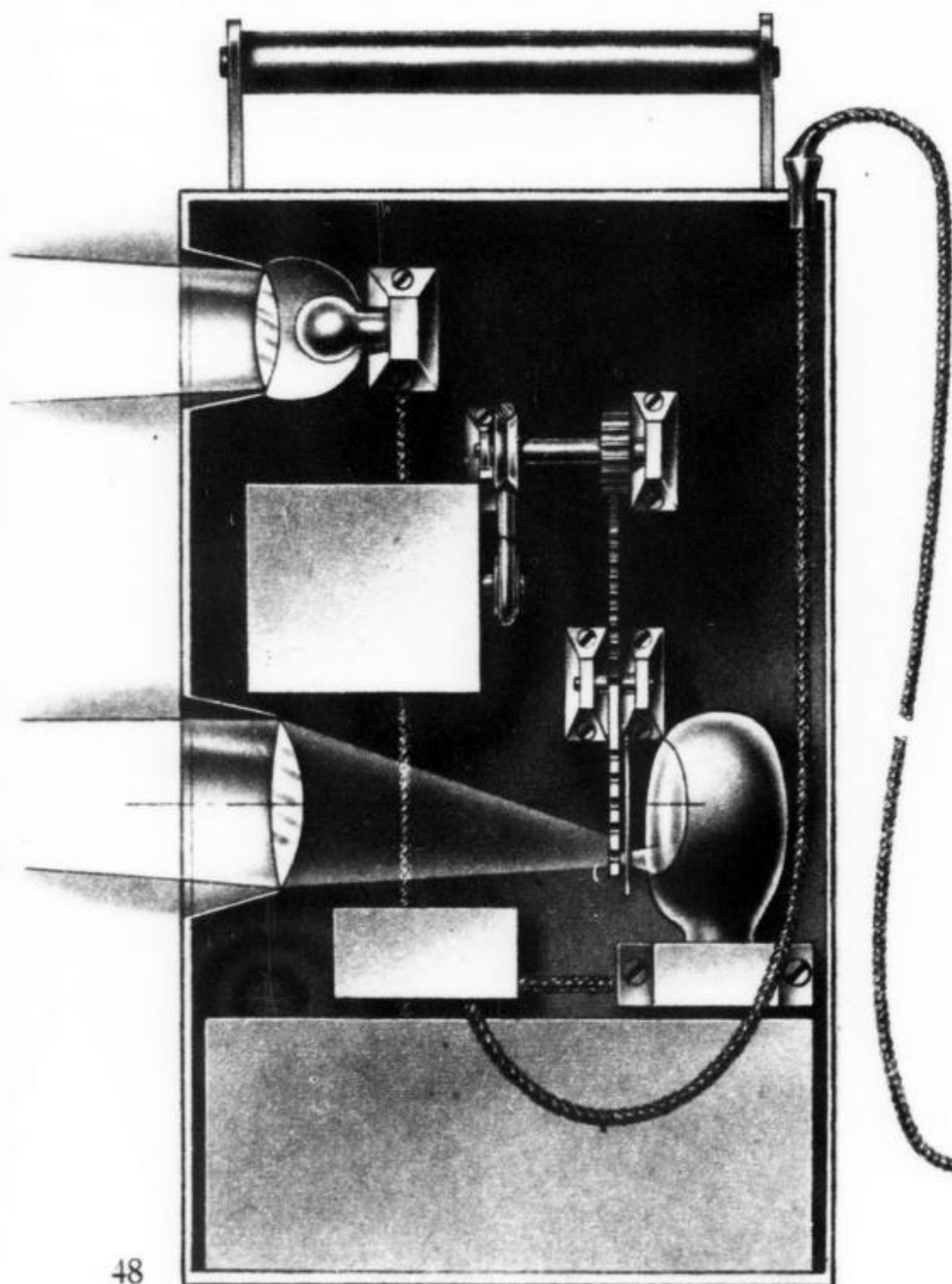
NEARBY objects may now be heard. Electronic principles analogous to radar have just been employed in the "radar eye"—an apparatus enclosed in a portable box with a wire running up to an earphone.

In the front of the box are two lenses. One sends out a light ray from a small bulb; the other, when there is an object ahead, concentrates the reflected light into a photoelectric cell—to give a signal in the phone.

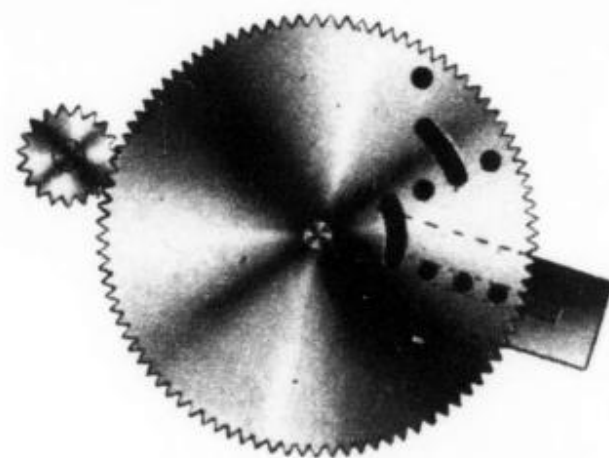
But it also tells the distance of the object. In front of the p.e. cell is a constantly rotating disk in one radius of which are five sets of round holes and slots, each set corresponding to a letter of the Morse code. The angle of the reflected light, varying according to the distance of the object, will cause a narrow beam to pass through one or more of these hole-letter-sets, and so signal the distance.

The "radar eye" is being developed by the Signal Corps as an aid to the blind.

A schematic drawing of the "radar eye" mechanism. The ray angles indicate focus on a nearby object.



Pointing is done with the carrying hand. (Below) The code disk with letter holes.

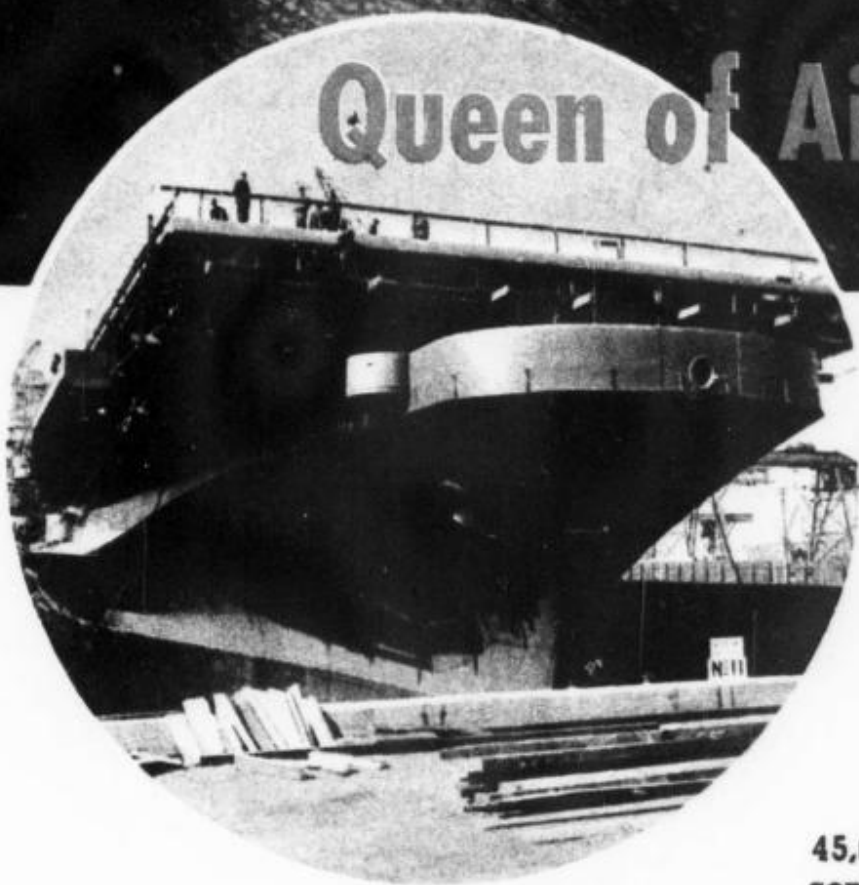




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Queen of Aircraft Carriers



Largest and fastest carrier ever built anywhere, the Midway is the new pride of our Navy.

45,000 ton Midway arrives at Norfolk Navy Yard for commissioning ceremonies. Closeup shows huge size.

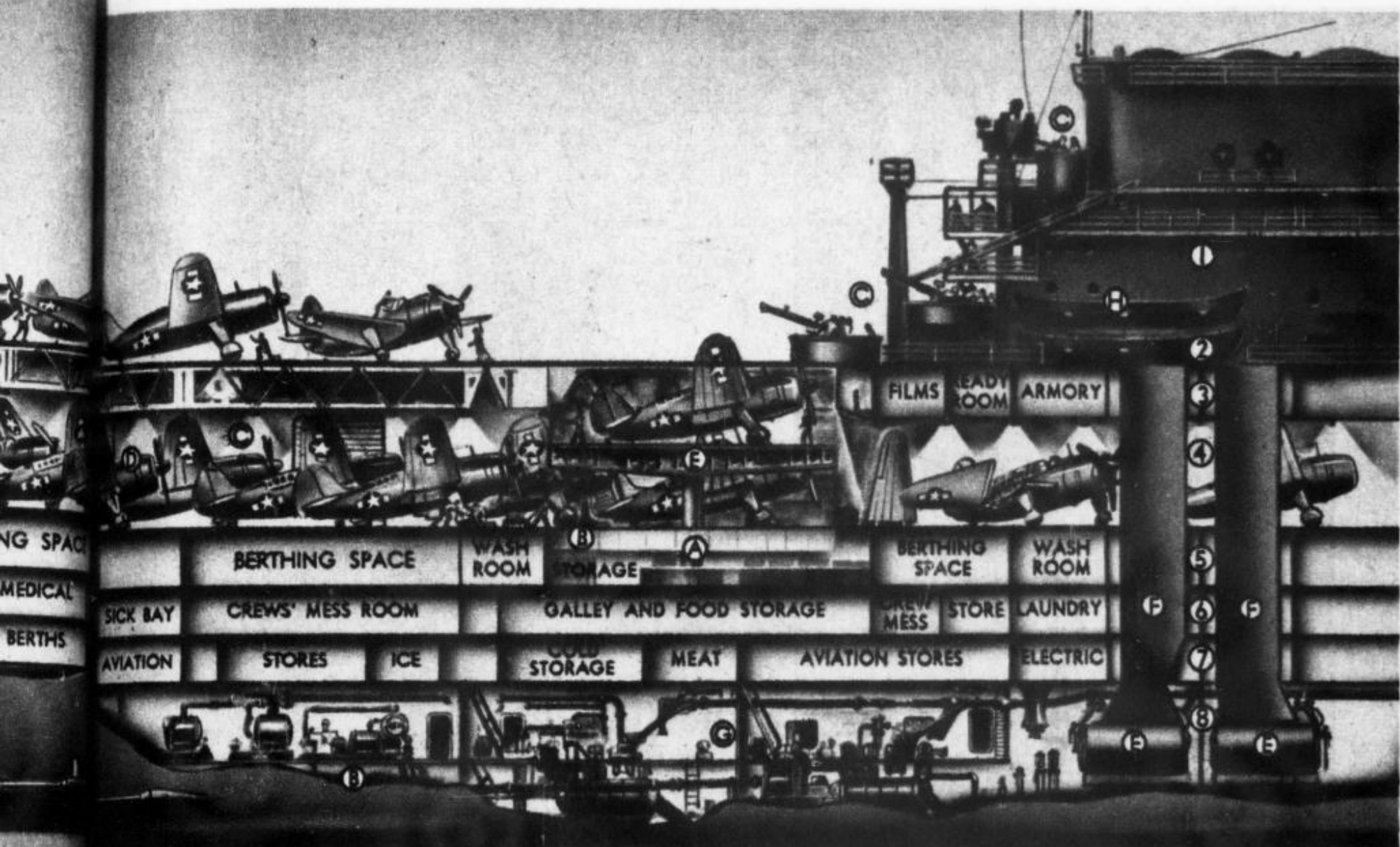
THE new pride of our Navy is the Midway, a vessel that represents a turning point in our naval history. A 45,000-tonner, she is the first of a new class of battle aircraft carriers, larger and faster than any previously in service. She was launched March 20, 1945, at Newport News, Va.

Her gigantic proportions stagger the imagination. The blue prints of the working plans had a weight of 70 tons and if placed together would be enough to carpet all the floors in 2,500 six-room

houses. The steel in her would build 25,000 passenger automobiles and the amount of work required to build her would be sufficient to fashion approximately 35 Liberty ships.

To keep in good condition the large stores of perishable foods for the ship's crew, the refrigerating capacity is equivalent to that of about 7,000 family refrigerators.

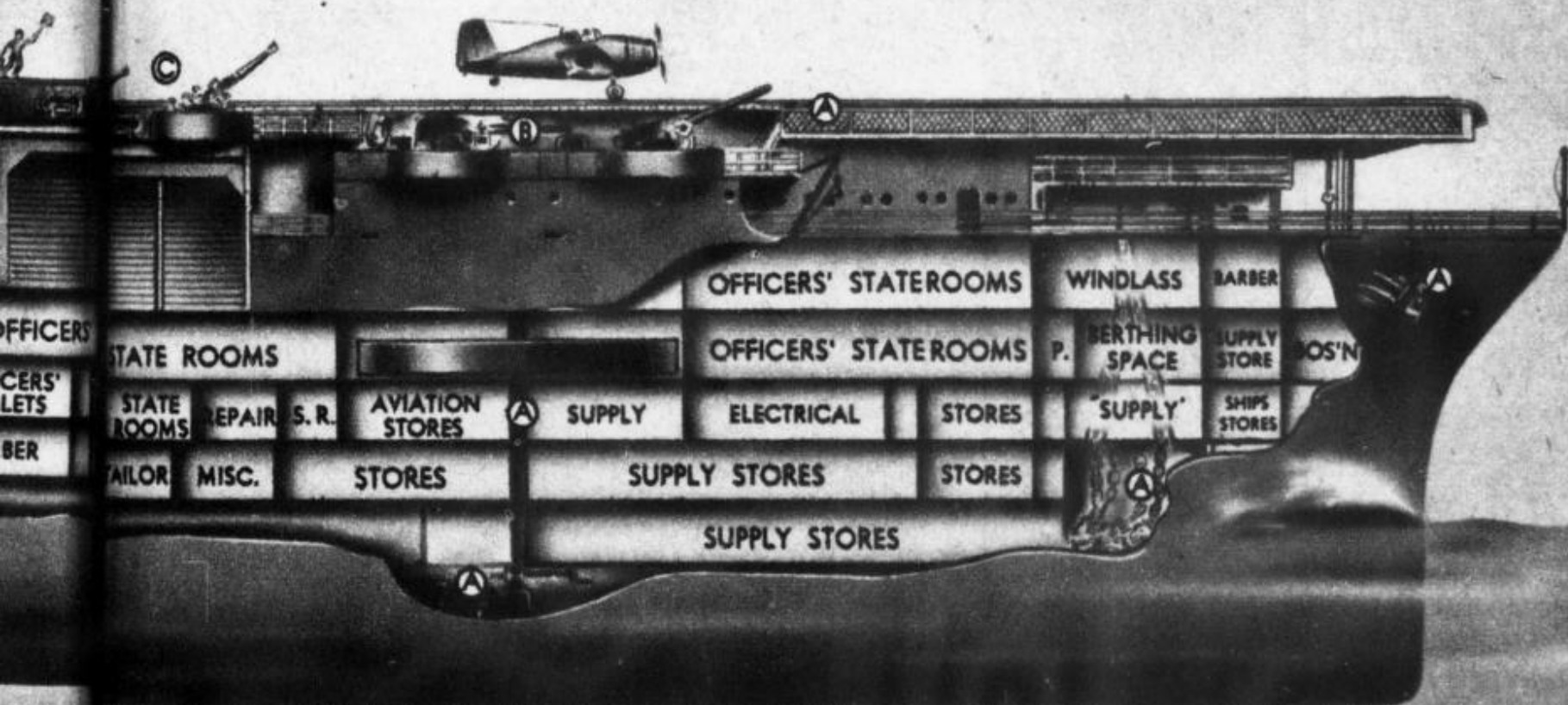
As to her exact size, you must do your own guessing for the Navy is revealing only the sketchi- [Continued on page 79]



- 2—FLIGHT DECK
 A—Walkway
 B—5 Inch Guns
 C—40 Millimeter Guns
 3—GALLEY DECK
 A—Forecastle Deck
 4—MAIN DECK
 A—Anchor
 B—Air Conditioner
 C—Hangar Space

- D—Parked Planes
 E—Elevator
 5—SECOND DECK
 A—Auxiliary Elevator
 B—Stowage
 6—THIRD DECK
 A—Elevator Plunger
 7—FOURTH DECK
 A—Chain Locker

- 8—POWER
 A—Elevator Machinery and Pump Room
 B—Generator Room
 C—Forced Draft Blower
 D—Boiler Room
 E—Boilers
 F—Uptakes from Boilers
 G—Main Engine
 H—Propeller
 I—Rudder

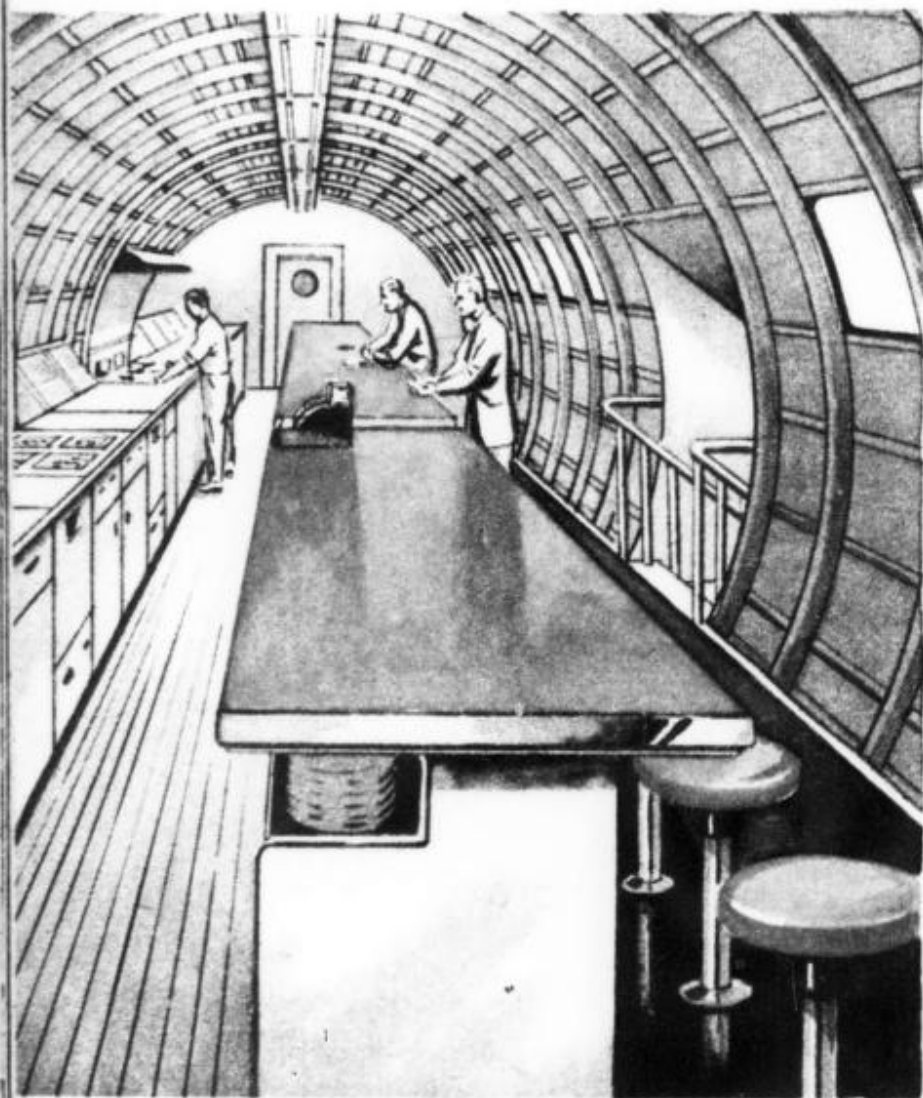


B-29 Beanwagon



Battle-scarred Superfortresses will be the novel homes for America's favorite eating spots

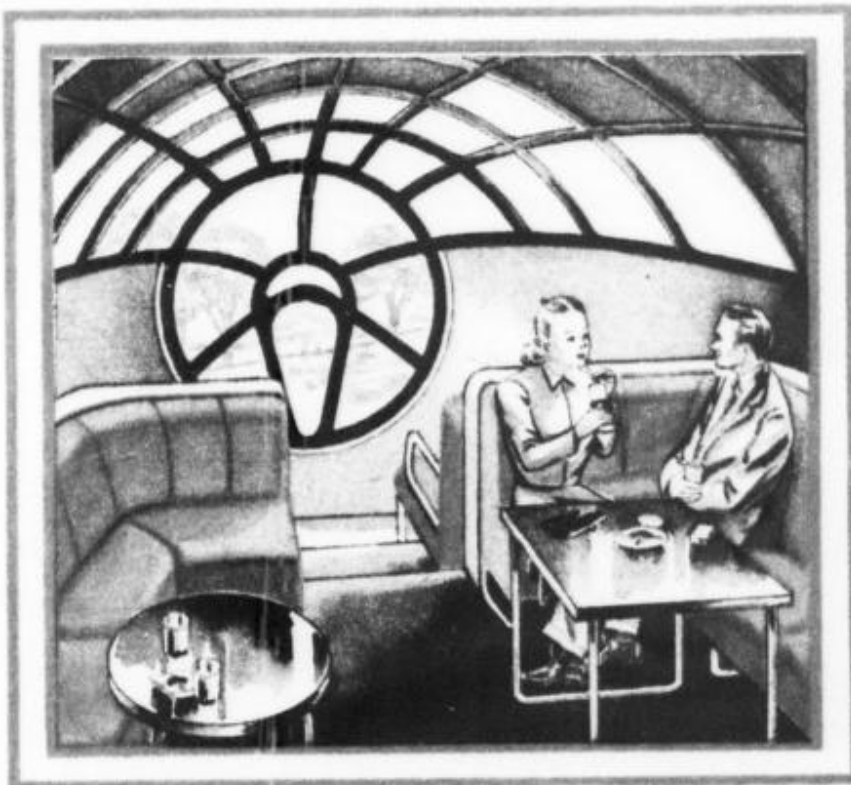
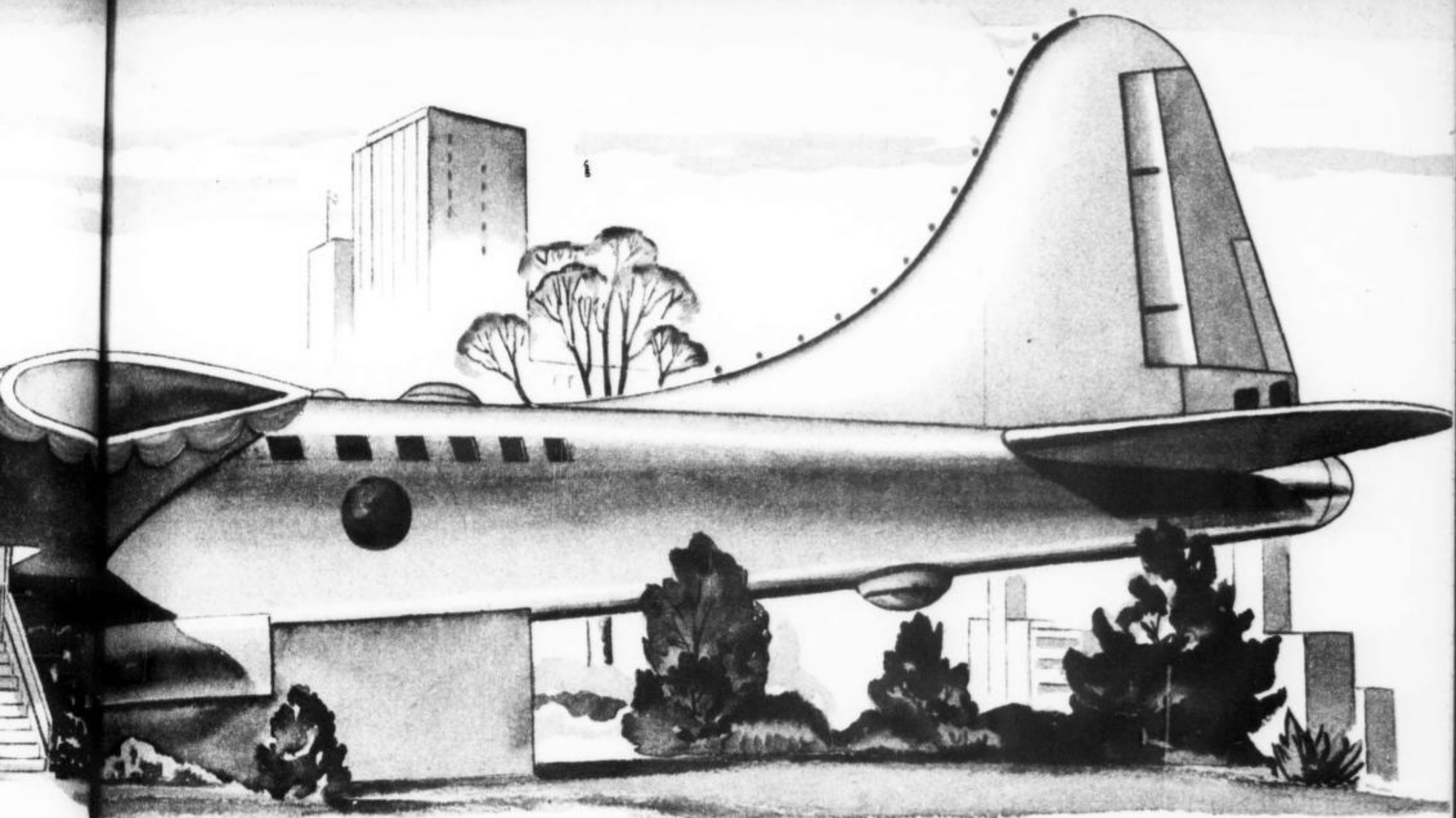
The long, spacious fuselage of the Superfortress is a natural for a diner counter.



THE lowly diner is being glamorized! No longer cramped within the narrow confines of the traditional railroad car, the once-humble home of the hamburger-apple-pie'n-cuppa-coffee will be resplendently housed in the AAF's proud and glittering Superfortress.

Honorably retired after long service, battle-scarred and weary, the B-29's that leveled Japanese cities are being brought home and parked in AAF depots across the country, there to await their fate. A few that are still young and strong will be retained by the Army for its own use; those that are badly damaged will be stripped of all recoverable equipment, then dismantled and sold for scrap. Some will go to schools and colleges for training and instructional purposes; and parts of the scrapped ones, particularly electronic equipment and engines, will be adapted to peaceful uses very different from those for which they were designed. In Europe, for instance, the engines of Flying Fortresses are used with pumping systems to pump out the flooded fields of Holland.

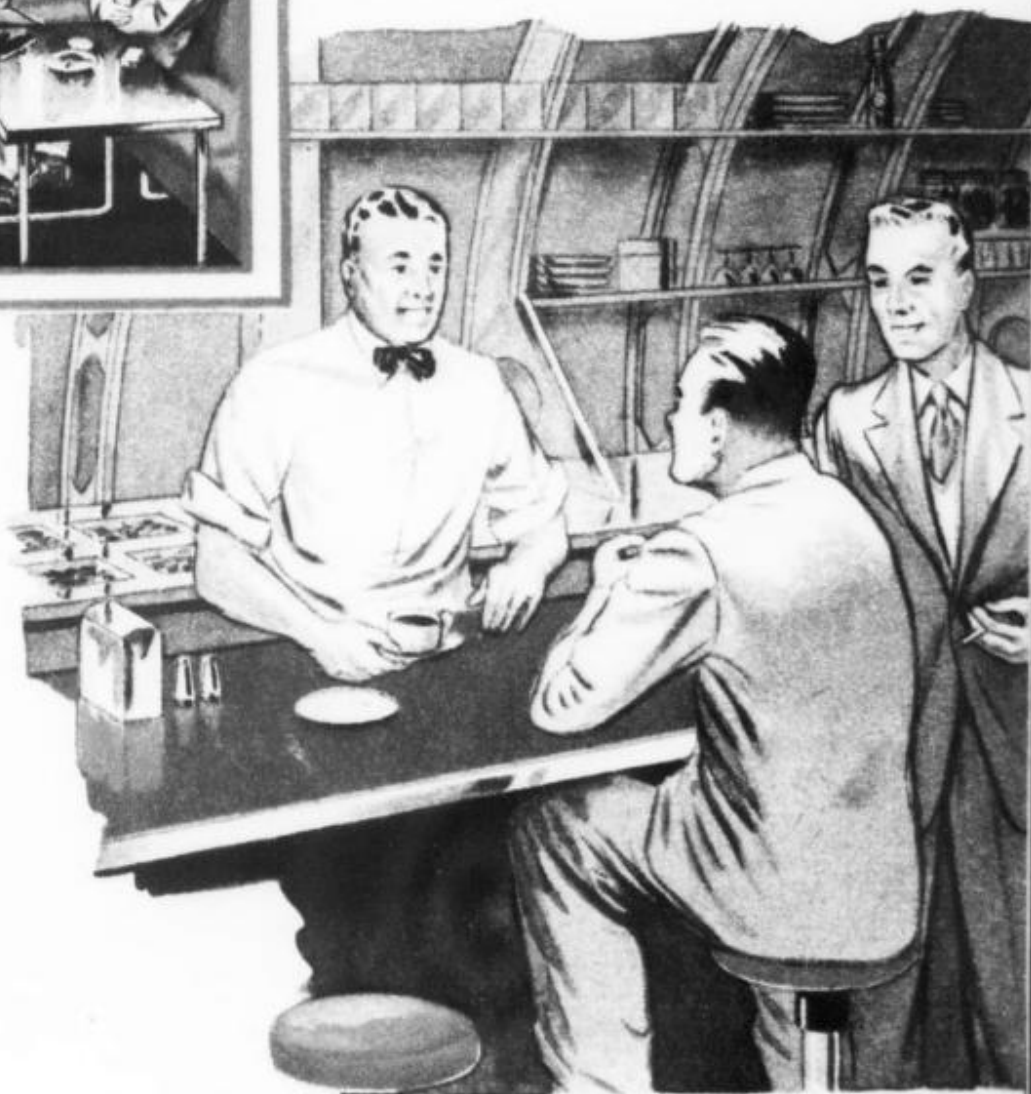
But the most novel use yet thought of for using a Superfort intact is that of converting it into a diner. The long, cylindrical fuselage of the big bomber is perfectly adaptable to a diner's long counter setup, while the shining exterior is an eye-catcher that will bring in the customers.



Impractical as battle monuments, B-29 diners will remind Americans of their heroic role in the war.

In the converted nose of the big bomber you will be served super-fortified tomato juice with your hamburger - pie'n - cuppa - coffee.

■ The drawings on these pages were made by MI's staff artists to illustrate ways in which B-29's can be adapted to civilian use. The size of the fuselage makes possible the installation of a long counter and complete kitchen facilities. Stripped of its wings and mounted on a solid base, the big plane, built to withstand the strains of flying and the rigors of combat, can settle down to many years of useful life, its shining aluminum skin and familiar shape a constant reminder to us of the great role it played in World War II.



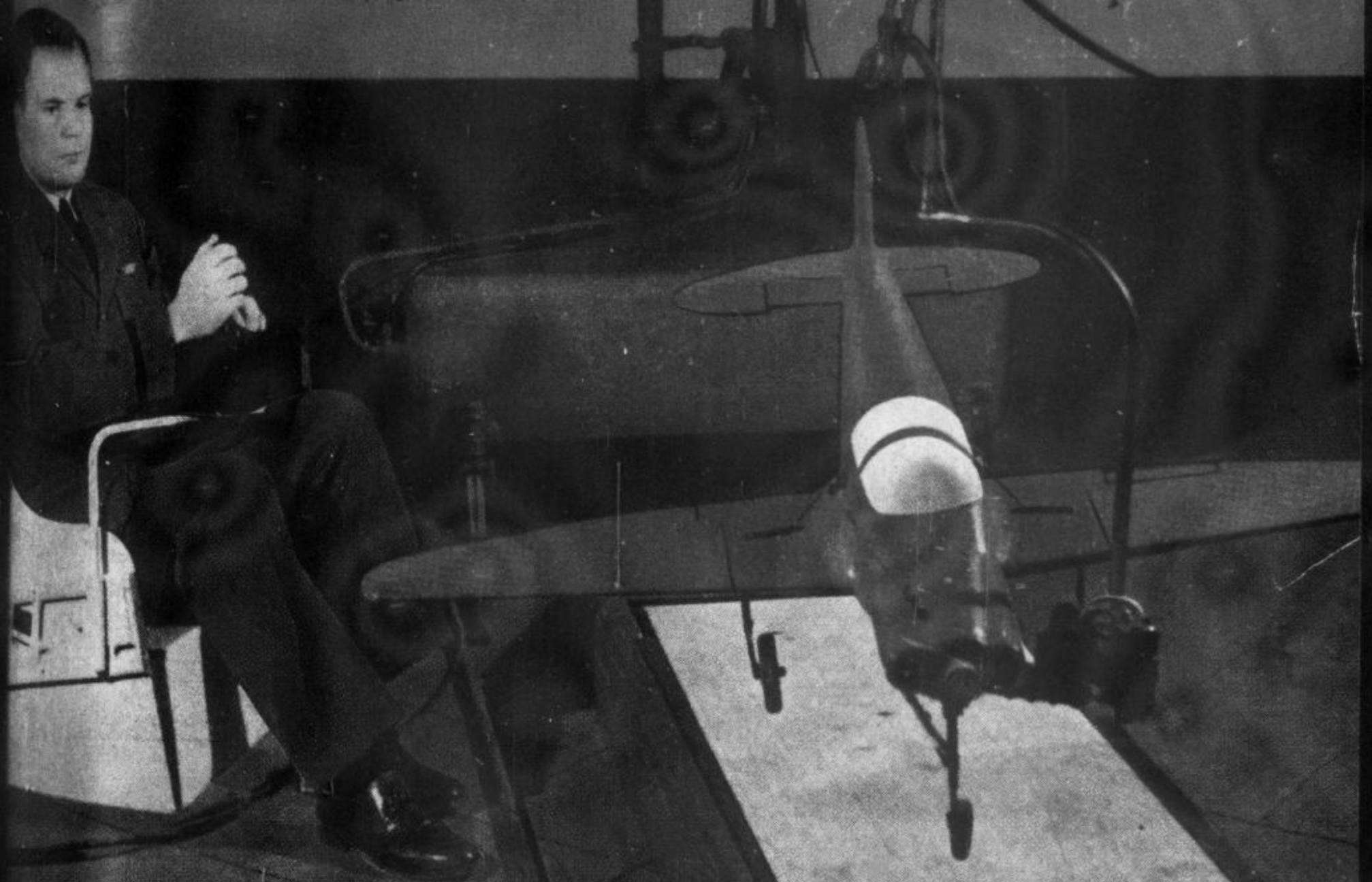
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Pilot Trainer for Drone
Planes—See page 59



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mechanix illustrated

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JULY, 1947

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Drawings by Martial and Scull, Industrial Designers.

RELAX ON AIR

BY JACQUES MARTIAL,
as told to Sophie Smollar.

Mechanix Illustrated

Light-as-a-feather rubber and inflatable air pockets may soon replace the heavy box springs of present furniture.

RELAX on air! That's the promise of tomorrow's rubber furniture which will soon be replacing much of the overstuffed, coil-spring type in common use.

Furniture manufacturers, long plagued by shortages of materials and also by a dearth of new ideas, have sought a way to produce comfortable and low-cost furniture. Now they claim to have found the answer in the principle of the air-filled rubber tube. With inexpensive materials and simple assembly, manufacturers foresee mass production with furniture prices spiraling downward.

The first rubber furniture on the market consisted of solid wood pieces covered with a thin layer of rubber, a far cry from the double spring action of upholstered stuffed furniture. The second step was the development of the use of foamed latex. This was better but does not compare with newer combinations which, like rubber tubes, combine air and rubber for resiliency and so-called good posture pieces that rebound to original shapes without prompting.

The war interrupted the application and further development of foamed latex which went to cushion our fighting men against concussion. Before Pearl Harbor, however, the material did appear in seats for automobiles, trains and buses.

Foamed latex, according to the Rubber Manufacturers Association, is a network of open or interconnecting cells made from rubber latices or liquid rubbers and manufactured in sheet, strip, molded, or special shapes. For those who are unfamiliar with it, latex in its pure form, is the milky juice or food supply stored inside the bark of a rubber tree. It looks like cream and is almost tasteless and odorless.

A small quantity of latex is whipped by a machine resembling a giant egg-beater. During this process, compressed air is forced into the mixture along with a jelling agent to produce what looks like an angel cake batter containing millions of tiny air bubbles. The liquid is then poured into a mould, covered, and either baked or vulcanized for 30 minutes. The finished

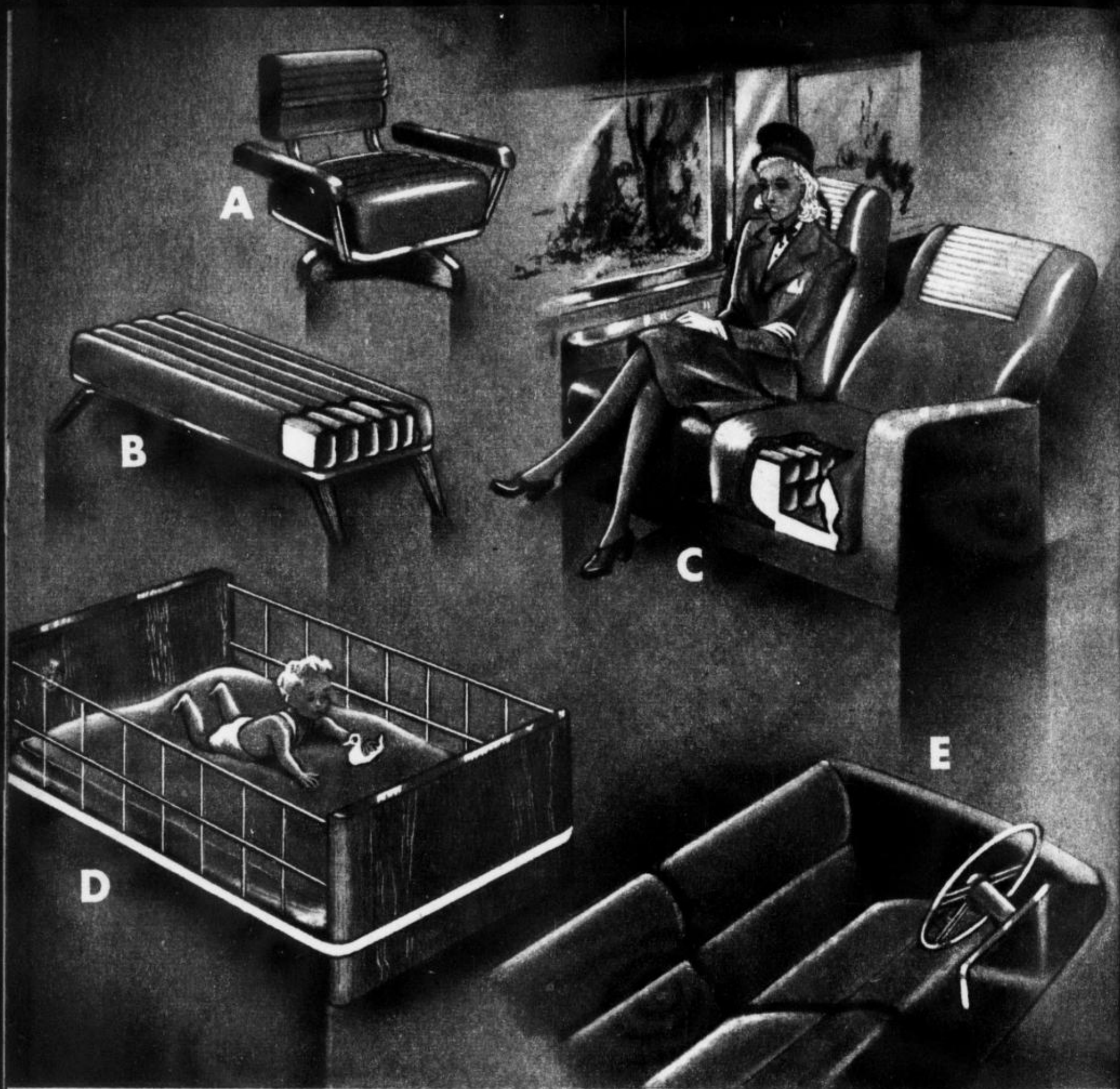
product has a satin-smooth top surface and underneath, has a light, completely porous body honeycombed with millions of tiny interconnecting cells.

Cellular rubber has been used in the past as an insulator for refrigerators and as a buoyant material for life-saving equipment. Not to be confused with sponge rubber which it resembles in feel and appearance, cellular rubber has certain properties possessed by no other material. It is lighter than cork and is moisture-proof. It derives its cushioning capacity from millions of microscopic cells filled with nitrogen—250,000 per cubic inch.

These tiny cells allow the material to conform immediately to the shape of the object thrown against it, giving support and at the same time exerting pressures that offset the effects of a

Believe it or not, that egg—raw, not hard-boiled—dropped eleven stories, bounced off the cellular rubber mat and into the man's hands without breaking. Tiny nitrogen cells in new material cause perfect deceleration.





Above: The new, air-filled furniture as conceived by Martial and Scull. A: Posture chair. B: Bench. C: Airline seat. D: Crib. E: Car seat.

Left: This portable easy-chair is a product of England. Concertina-like movement inflates it.



heavy blow. The air in sponge rubber escapes from the area where a blow is delivered, whereas in cellular rubber the gas trapped in each cell behaves like little balloons.

In a spectacular demonstration of the softness of cellular rubber, representatives of the United States Rubber Company dropped fresh eggs from the roof of an eleven-story building onto a three-inch thick pad of the new material. Eggs which missed the pad were, of course, smashed on the sidewalk. Those hitting the rubber target bounced back into the

Mechanix Illustrated



F: Arm chair. **G:** Twin beds. **H:** Three-way piece—can be made into corner chair (H-1), cot (H-2) or chaise-longue (H-3). **I:** Utility folding chair.

Right: The British chair in inflated position. Note small zipper bag in which it is carried.

air—in some cases as much as 25 feet—and were caught unbroken by an assistant.

In addition to the softness of material, the new furniture will depend for comfort on air-filled sections of two types—single tube or multiple compartments with connecting air holes. Valves will be installed somewhere in the seam of the cushion. When air must be replenished, a small hand pump will easily supply the necessary low air pressures. Pumping should not be required more than once in one to three months. •

July, 1947





HIGH-SPEED ESCAPE

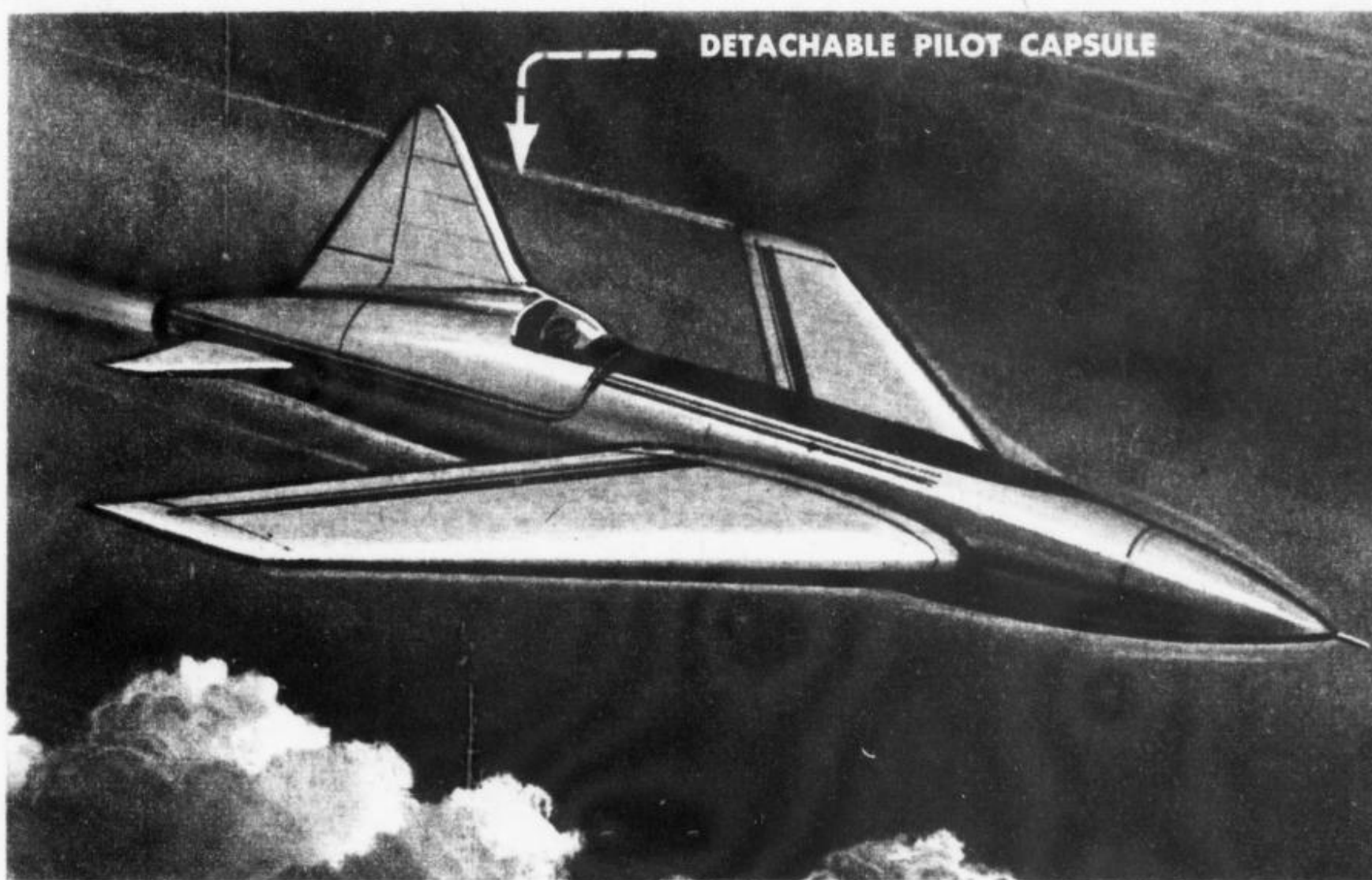
So that high-altitude bail-outs will not kill, the fast new planes are being designed to come apart, allowing a safe drop in a tight capsule.

BY ERIC SLOANE

AT 60,000 feet the flyer's plane becomes his cell of life, its equipment almost as important as his own body. Outside the plane the cold of space is of instant-freeze intensity, much colder than any thickness of clothing could protect from. It is so thin that an exposed human's body would cease to function. Blood would boil there at body temperature. Death from oxygen lack would occur quickly. Accordingly, the high-altitude plane has a cabin pumped with high-pressure air. Heated clothing is plugged into the plane's power line. The flyer's lungs are con-

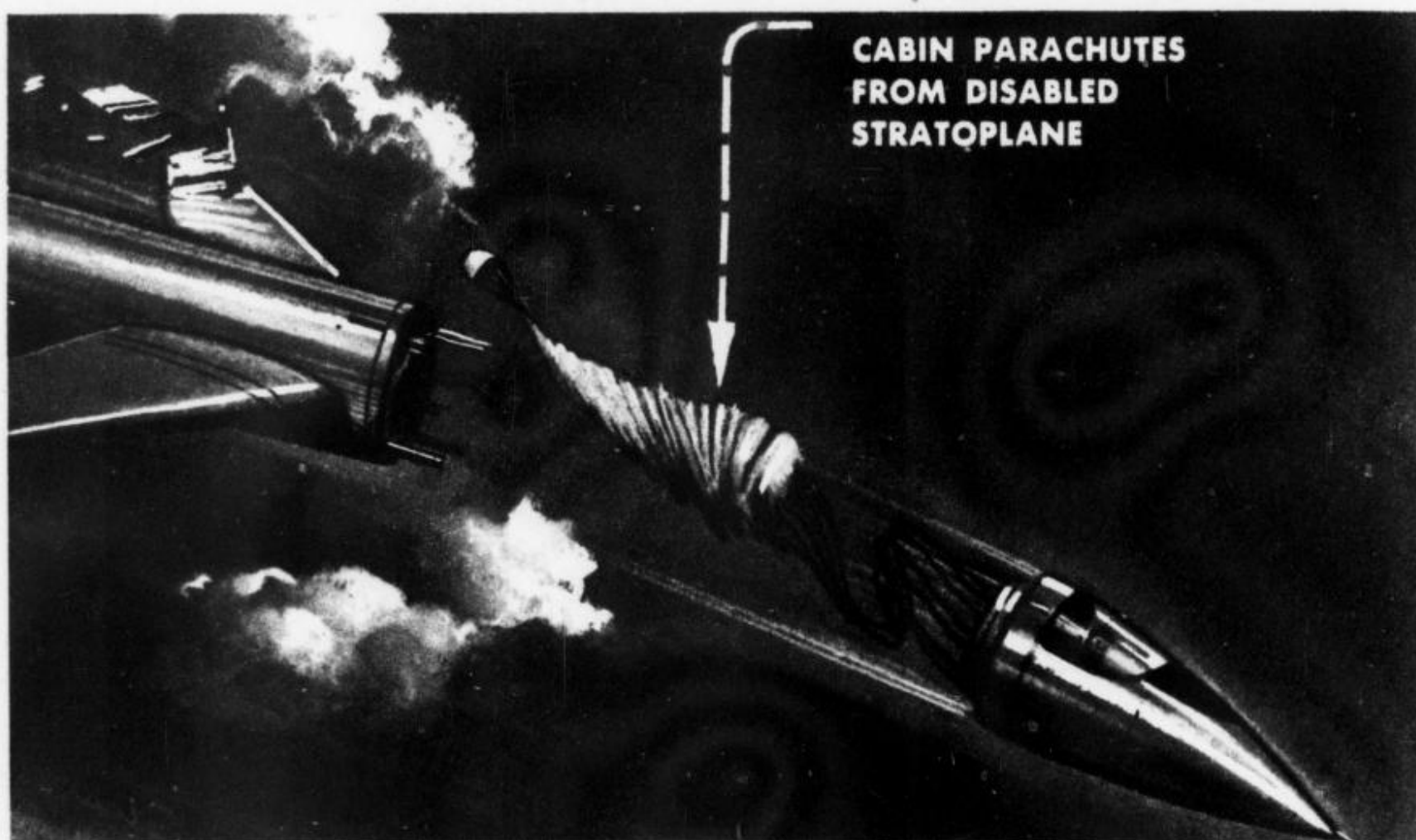
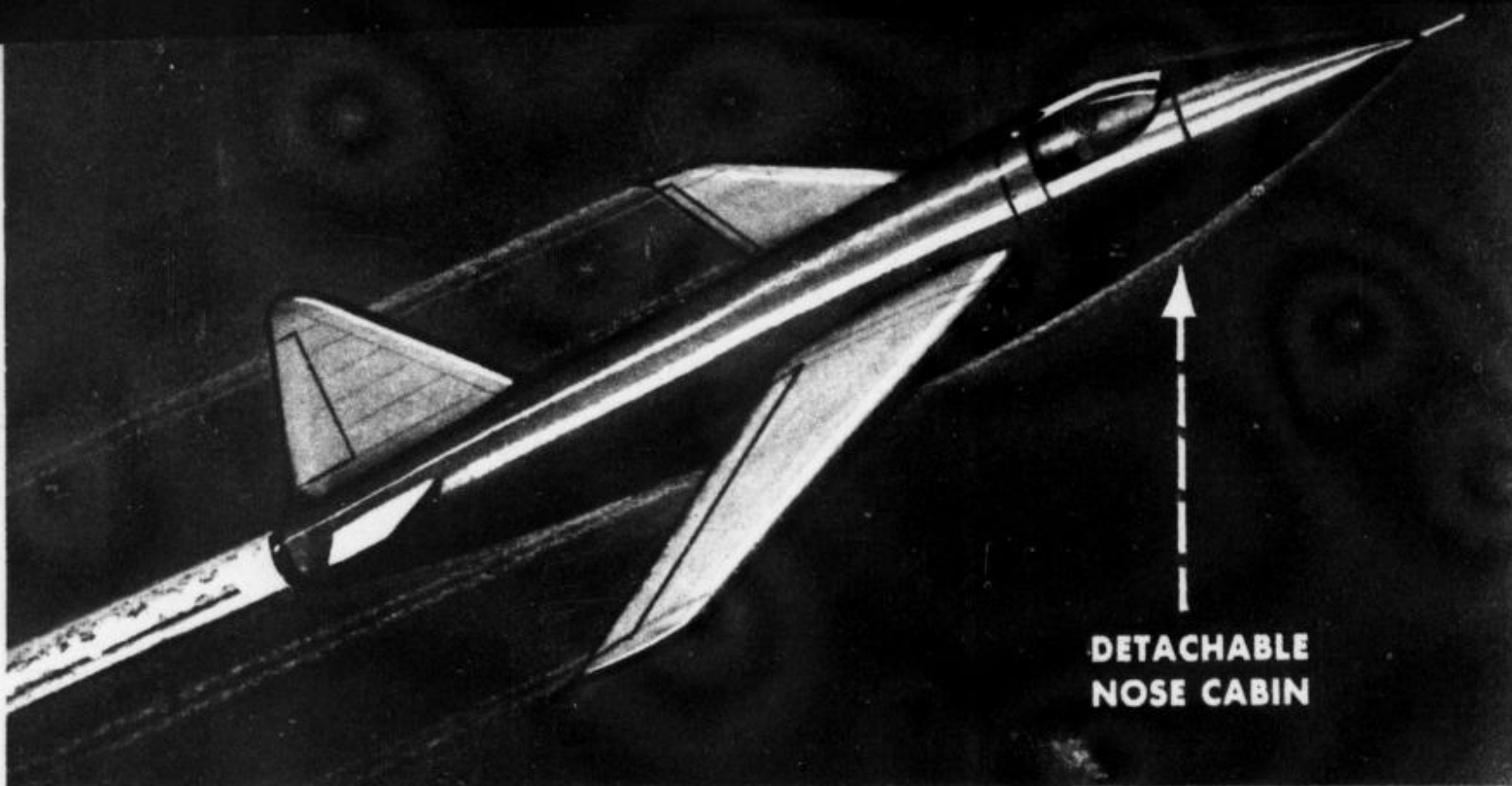
nected directly to the ship's oxygen supply by means of a mask. To abandon such a design for living at 60,000 feet would be like leaving behind the most important organs of the body. Yet if things go wrong with the high-altitude supersonic ships now being designed, it may be necessary to abandon ship at stratospheric heights. What then to do?

Even at 45,000 feet (today's flight ceiling) a flyer cannot safely parachute from his ship. No flyer in his right mind would bail out from great heights when he can ride his ship to safer levels first. It would take a parachuter about a half

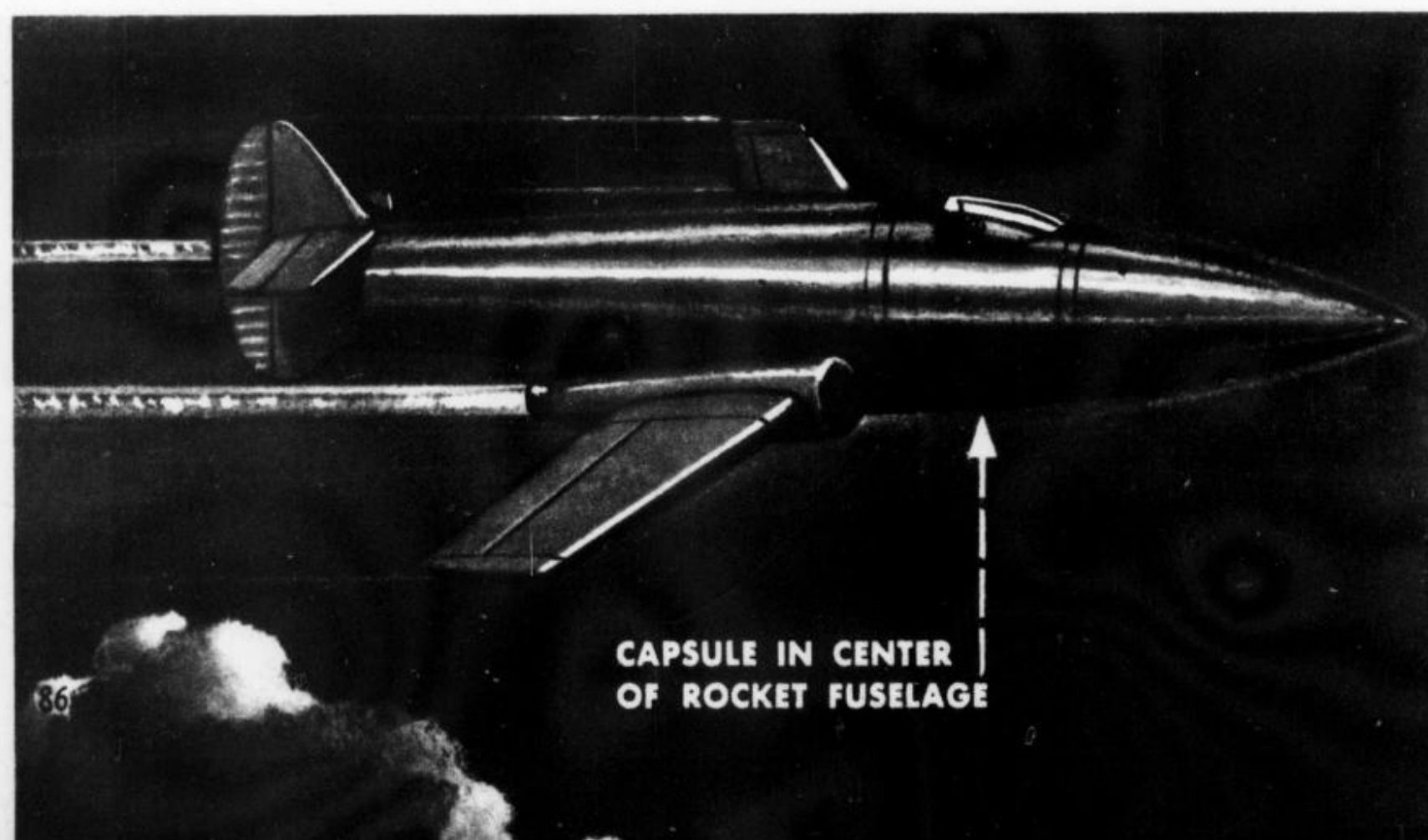


In an emergency the pilot's capsule is detached and parachutes downward; then, at a safe altitude, the pilot jumps out and continues on down, using his own parachute.





Top drawing shows the capsule as located in the nose, and just below we see it right after being detached, its parachute beginning to open, the pilot safe in his pressurized cell until it's time for him to jump free. Below and across the page we see the centrally-placed capsule, which requires detaching by means of explosive rivets.



Any
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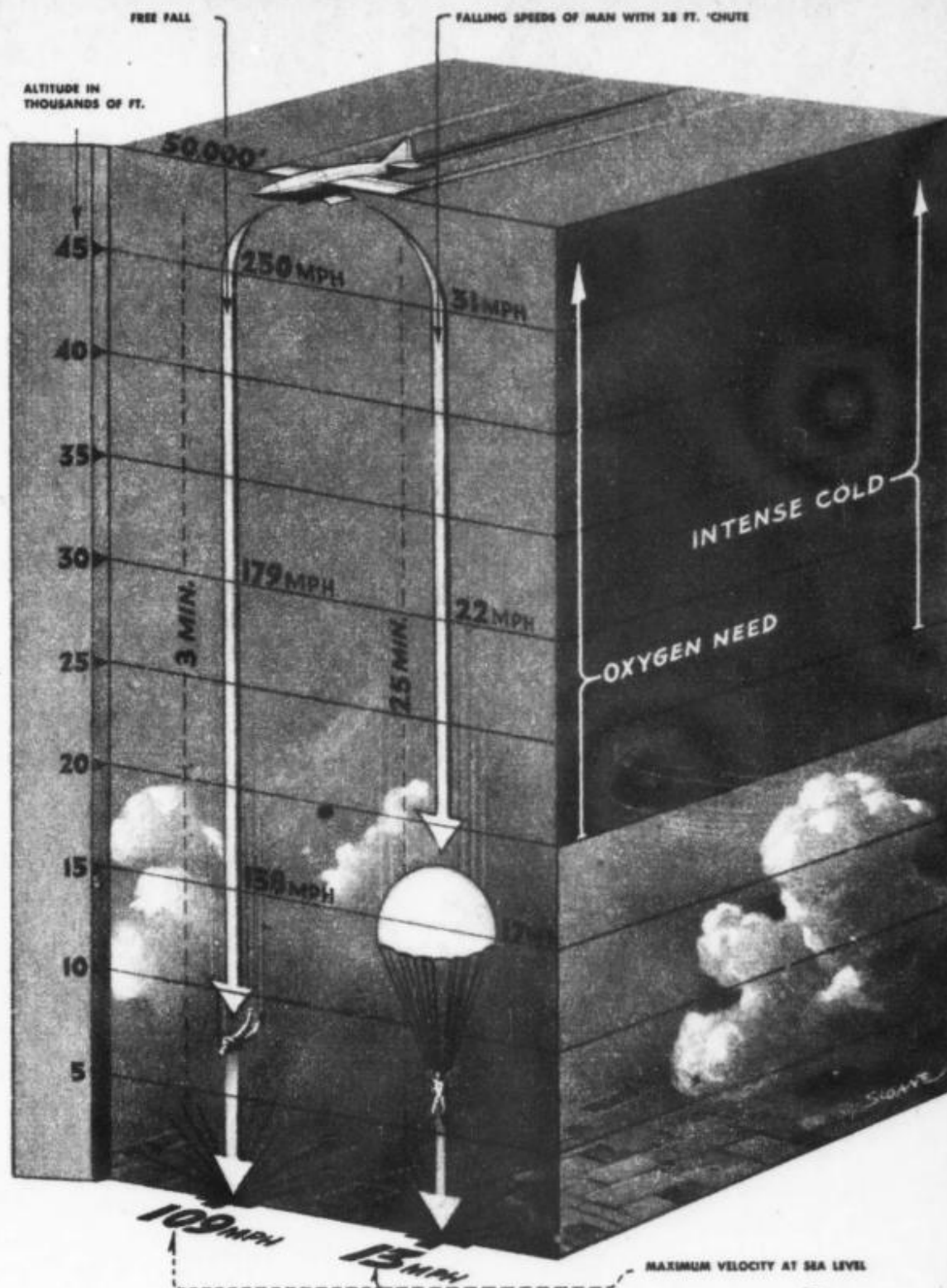
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Any pilot who bails out at 50,000 feet dies on the way down. Only a capsule will let him fall safely.

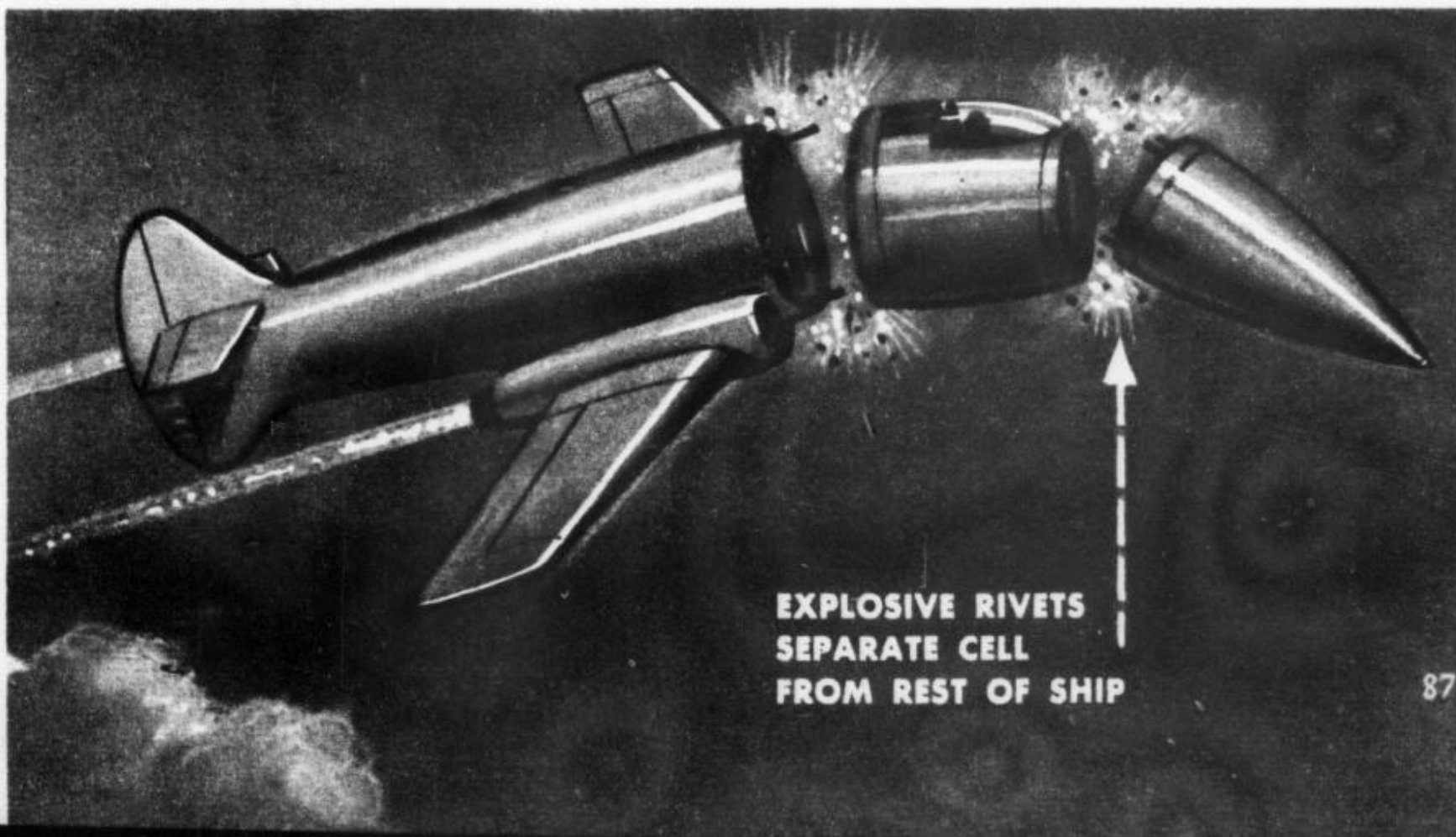
hour to float to earth from 50,000 feet, time enough to make the trip fatal. The trick is to fall free—about a three-minute trip—through the deadly thin air, then open the 'chute at about 10,000 feet. Of course you would have to carry a portable oxygen bottle for even that short fall through the dangerous area. It is interesting to note how the body falls slower as it approaches the denser air near the earth. Although you would fall at 275 mph from 50,000 feet, you would strike the ground at only 109 mph. These speeds are maximum velocities for the man of average weight. In the chart, the darkened portion is that area to be dropped through at the greatest speed—where cold and thin air mean death within a very short time.

Another stratospheric parachute difficulty is the yet unexplained shock experienced at the 'chute's opening. One would think that the greater speed would be counteracted by the thin air, but no. The shock of opening a 'chute at high altitude often reaches 40 G's! Even at low altitudes, if you opened your 'chute at 400 mph you would add 6,000 pounds to your weight; not only would your



body break, the 'chute would, too. Only a closed cell or "capsule" could protect the flyer when abandoning ship either at supersonic speeds or at great heights. A ribbon-type chute would then be reefed out until the capsule has slowed down to normal falling speed, then allowed to blossom to full size.

The drawings show three [Continued on page 162]



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Cover painting by Victor Mays

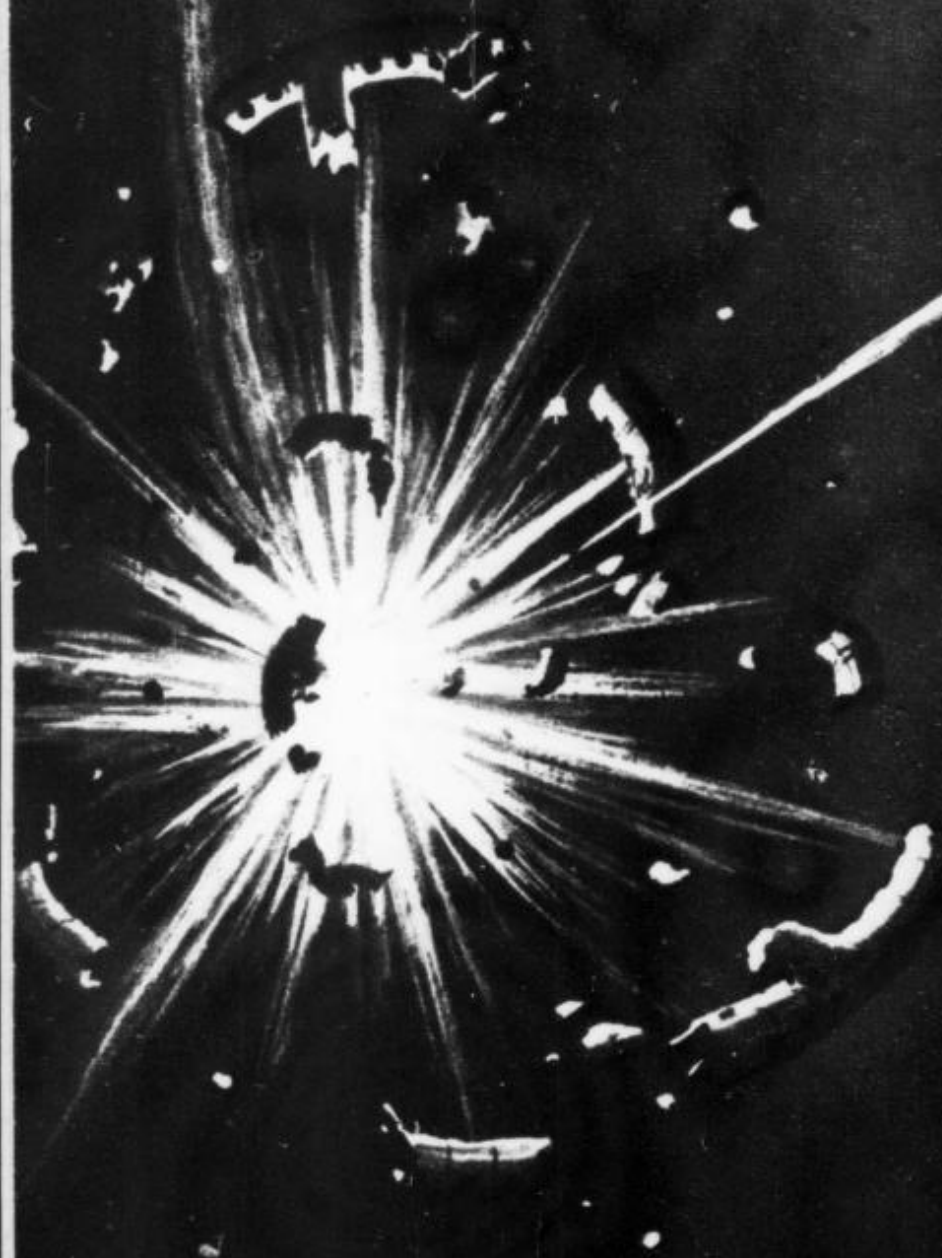
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NEXT STEP INTO SPACE...

MANNED SPACE SCOUTS

*Capable of changing orbits at will,
they would guard against sneak attacks.*





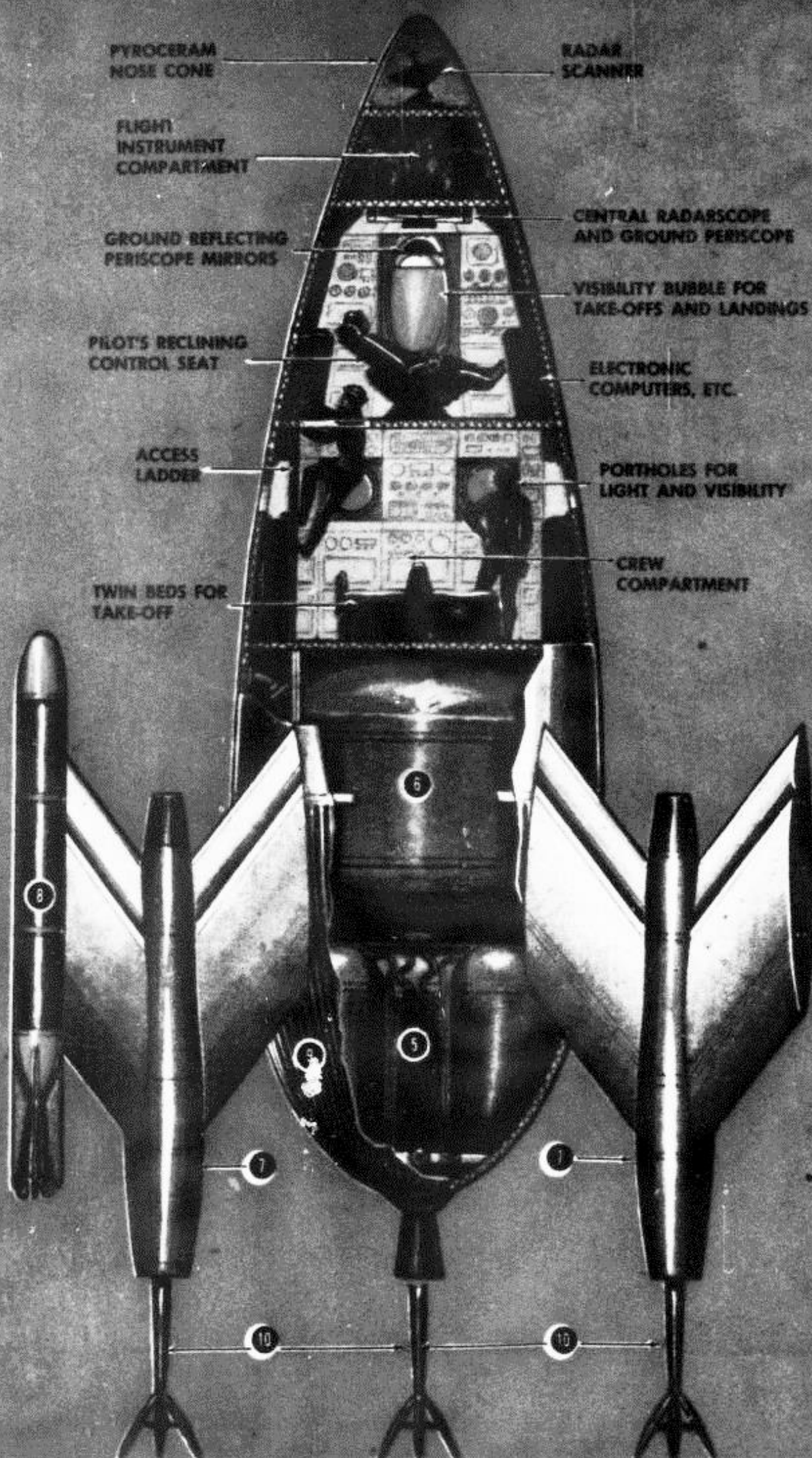
ARMED with deadly and accurate atomic missiles, this versatile manned space scout could seek out and destroy enemy satellites.

By G. Harry Stine

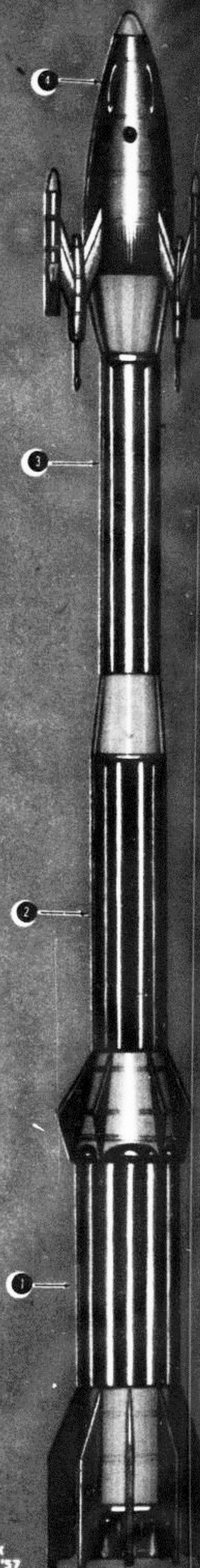
MANY reasons have been given to justify building a manned satellite and placing it in an orbit around the Earth. One of the most persistent of these reasons is the ability of the satellite to act as a scout, flying high over potential enemy territory

By Frank Tinsley

THE orbital scout satellite, outlined by Mr. Stine in the adjoining column, must be a versatile vehicle. Launched by a train of booster rockets, it will take off like the final "step" of a high altitude missile, curving into its initial orbit at the top of its arc. Once outside the atmosphere, it will



DETAILS of MI's space scout design and construction. 1. First booster stage with nine solid propellant rockets drops off when exhausted; 2. Second stage has seven rockets, ignites automatically when first stage burns out; 3. Third stage with four rockets turns parallel with earth's surface, ejects vehicle into orbit; 4. Three-man space scout vehicle; 5. Liquid fuel rocket engine; 6. Main fuel tank serves both rocket and jet engines; 7. Three supersonic jet engines are used to return to Earth; 8. Three atomic missiles capable of being launched from wingtips; 9. Corrugated, large area tail cone cooled by liquid oxygen to permit high speed re-entry into atmosphere; 10. Shock-absorbing feet of landing legs open for better weight distribution.



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with powerful TV cameras and telescopes capable of detecting new military installations, troop movements, sailing of warships, etc.

While it is possible for satellite-based equipment of quite modest size to spot a ship or train from an altitude of 1,000 miles or so, there is a better way to do the job!

In a recent magazine article, Commander L. J. Stecher, Jr., of the U. S. Navy points out that a manned space station in permanent orbit around the Earth is at a grave disadvantage because its future positions can be determined with high accuracy. Utilizing satellite tracking cameras, such as were used to spot the Sputnik satellite, any potential enemy can find a space station in the sky and, after making enough sightings, very accurately determine the orbit.

Any potential enemy can therefore go merrily about his business when the station isn't around to snoop, then head for cover when he knows the station will be in the sky overhead.

What, therefore, constitutes the better way of performing this scouting task from space?

The answer is simple: temporary space stations. These can be nothing more than three-man space ships, cousins of those which would be required to carry cargo up to a permanent station. They would be orbital scouts, capable of being launched from a number of places, including the decks of ocean-going warships, at times which could not be predetermined by the enemy. Furthermore, they would be capable of entering many types of orbits—equatorial, polar, or inclined—and there would be no way of knowing just which orbit they would be in at a specific time.

Orbital scout ships would be capable of circling the Earth several times. While in orbit, they could actually change orbits. Using their rocket motors, they could break orbit and return to the surface of the Earth with their films and reports.

This method would be quicker, cheaper, more efficient, and more effective than unmanned satellites. Such ships would be hard to spot. Furthermore, unlike [Continued on page 185]

cruise like a spaceship, changing orbits at will so as to observe earth installations at unexpected intervals, or seek out and destroy potential enemies. Earthbound, the scout must be designed to re-enter the atmosphere without burning up. Finally, to return successfully to its base from any orbit or angle of terrestrial approach, the machine must be capable of ordinary plane-like flight through the atmosphere.

To fulfill these varied functions, MI's "satellite killer" is designed to fly either nose or tail first, driven by a rocket engine in space and by a triad of jets for more economical propulsion in the atmosphere. The latter are mounted on three MW type ultrasonic wings, fitted with conventional airplane control surfaces. An elongated nose cone, rooted in the forward wing spar, projects from the air intake of each engine and serves as a landing leg. Each is equipped with an internal shock absorber and expanding petal shoes at the tips. Together they form a highly stable tripod rest. The basic design of the ship with its heavy fuel load carried in a fat, tear-drop belly, makes it virtually non-capsizable.

The principal propulsive unit is a liquid-fuel rocket engine, mounted in steering gimbals and set in the bulbous tail of the body. This is used at the final step of take-off and during space flight when a change of orbit is desired. It is also used in short bursts to brake the ship's descent when re-entering the atmosphere and in the normal tail-first landings at the base. This engine has the great advantage of being controlled by means of a throttle and it can be started, run fast or slow and shut off at will.

To resist the enormous temperatures, the latest missile materials and design features have been incorporated in the space scout. These include the new PH-15/7-Mo heat resistant stainless steel, titanium and Pyroceram nose and tail cones, capable of retaining rigidity of form at 2,200° F. In accordance with up-to-the-minute missile design, the tail cone is large and bulbous so as to provide maximum heat diffusion area. This is almost doubled by corrugating the material and is further cooled by circulating liquid oxygen before it enters the engine to combine with the fuel. The rest of the scout's shell is constructed of stainless steel in honeycomb sandwich form. This combination of materials amply fulfills strength requirements and overcomes the skin friction heat problem.

The two-deck crew area, situated above the fuel and oxydizer tanks, consists of a control level fitted [Continued on page 178]

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WEEKLY PUBLICATION

MECHANIX

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ILLUSTRATED

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MARINES TURN
PARATROOPERS
SEE PAGE 64

What Your
FIRST
PEACETIME
AUTOMOBILE
Will Look Like!
See Page 40

MECHANIX ILLUSTRATED

W. H. FAWCETT, JR., President

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, Aviation; Norman C. Lipton, Photography; Charles D. Bonsted, News; Shirley Cutter, Production

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SPECIAL FEATURES

On the cover: Rudy Arnold took this natural-color photograph of Sgt. Roland Kachinsky at the U. S. Marines' Paratroop training base in eastern United States. More views of these tough, daring fighters on page 64.

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THE MECHANIX ILLUSTRATED ADVISORY INVENTIONS BOARD

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Noted automotive engineer and inventor

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Aviation pioneer

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Noted physicist, chemist and inventor

SIR HUBERT WILKINS

Scientist and explorer

DR. JAMES L. CLARK

Explorer and Assistant Curator of the American Museum of Natural History

LT. COMDR. BOB BARTLETT

U. S. Navy

ROBERT COLES

Noted astronomer, Assistant Curator of the Hayden Planetarium

NEXT MONTH!

Of the startling developments which the war has brought forth, none can be more fantastic yet offer greater possibilities for practical effectiveness than rockets! For its November issue MECHANIX ILLUSTRATED asked Willy Ley to review rockets' success in war to date—in aiding overloaded German bombers take off, in special airplane rocket-bombs, in launching gliders, for example—and indicate their future in bringing victory to the United Nations. Perhaps the foremost rocket authority in America, Mr. Ley, one of the founders of the European Rocket Society and its secretary for years, states the case for rockets with impressive authority. Look for his eye-opening discussion in November Mil



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YOUR FIRST PEACETIME

Here is a "sneak preview" of the wonders the automotive industry is preparing for tomorrow.

by Donald G. Cooley

Designs By Martial & Scull

BOMBARDIERS in Flying Fortresses are protected by blisters made of transparent plastics—and you'll look out through the same kind of plastics when you sit at the wheel of the car you'll drive after the war.

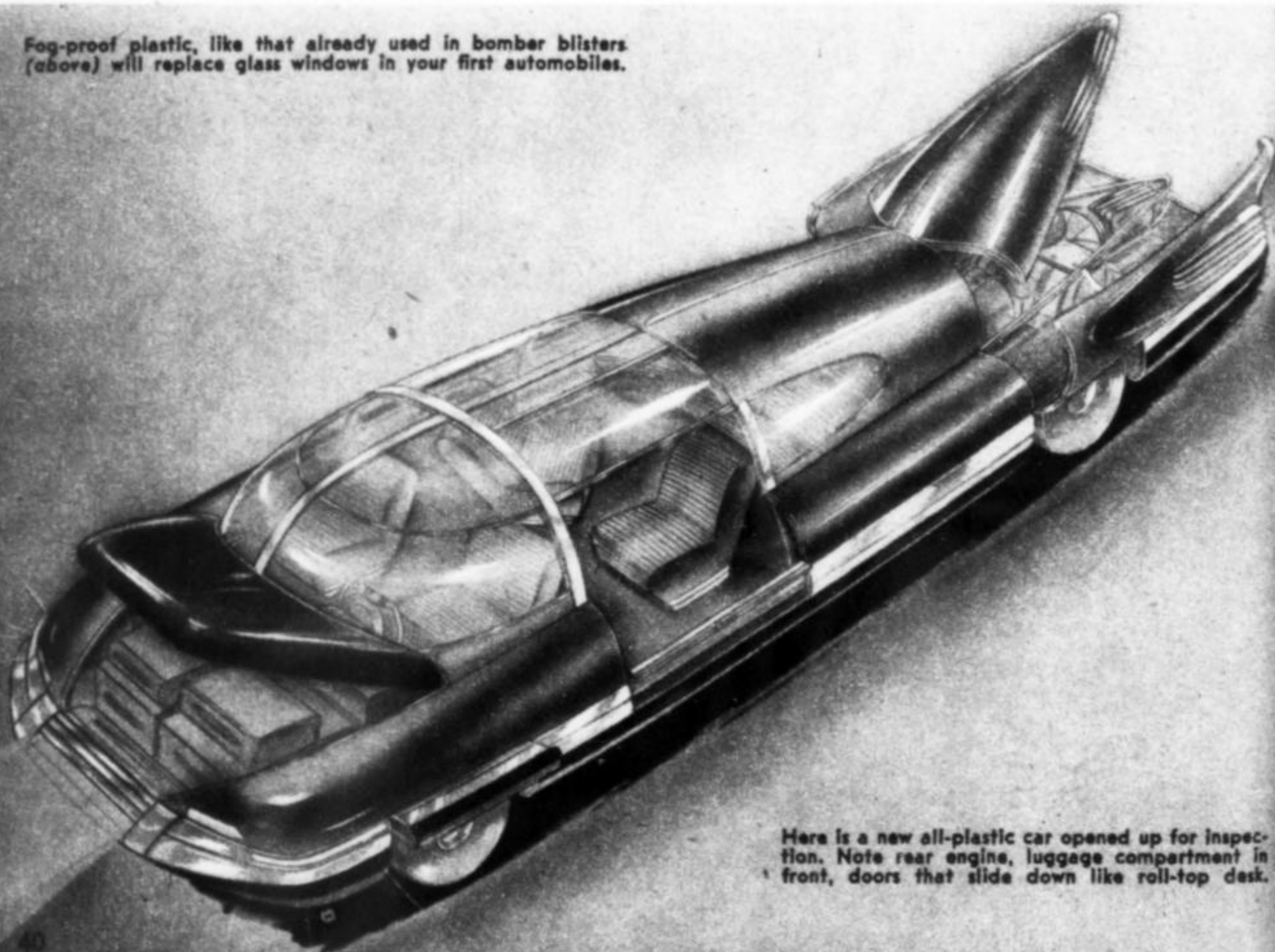
Tanks tilt and tip crazily across rough terrain as they roar into battle—and your future car will have riding qualities learned from tank mechanisms to smooth out the roughest road.

A mosquito-boat streaks like a rocket under the tornado of power kicked up by its engines—and your car will have the same kind of bucking-bronco energy from motors smaller and lighter than anything you've dreamed of.

An interceptor pilot screams down upon a



Fog-proof plastic, like that already used in bomber blisters (above) will replace glass windows in your first automobiles.



Here is a new all-plastic car opened up for inspection. Note rear engine, luggage compartment in front, doors that slide down like roll-top desk.

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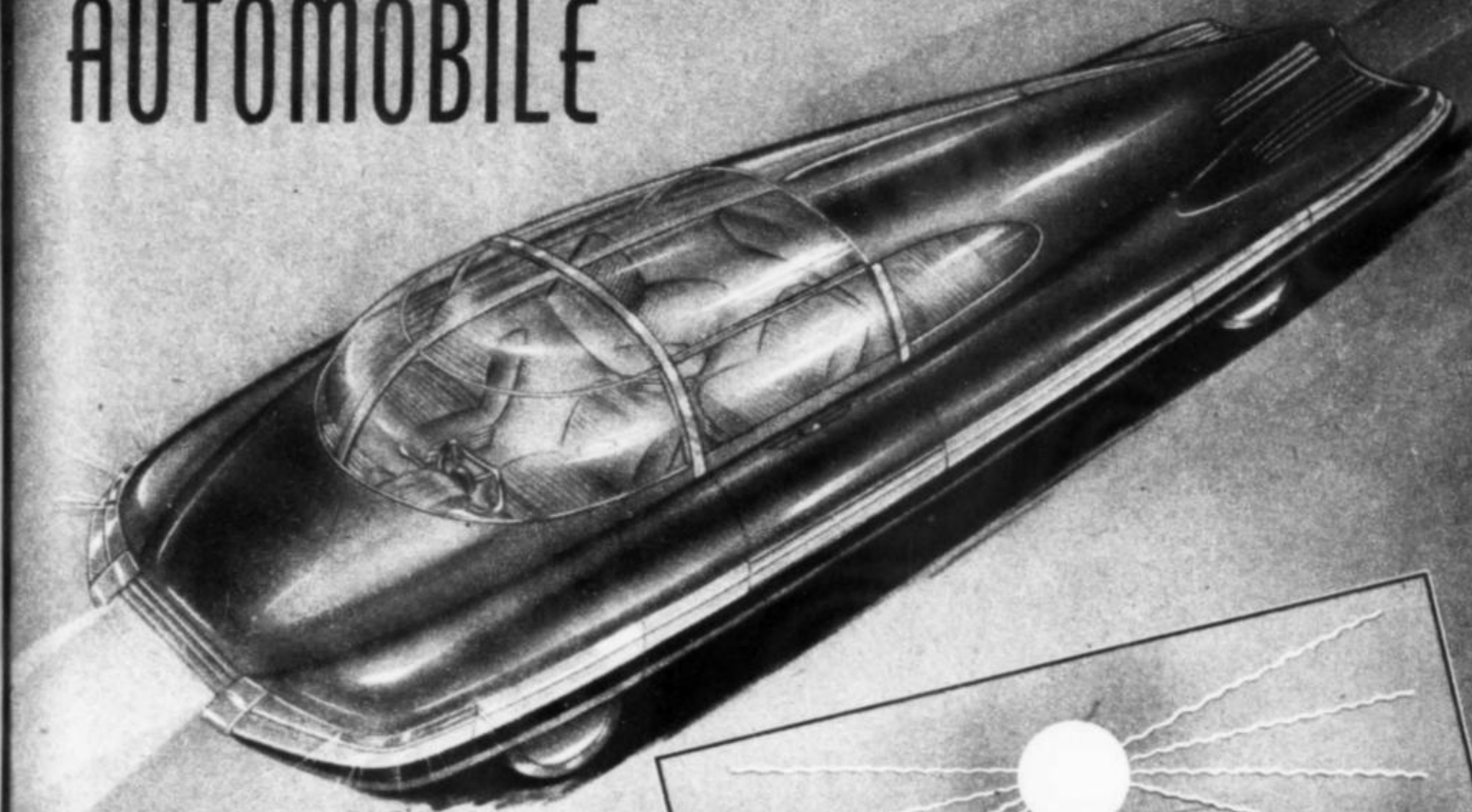
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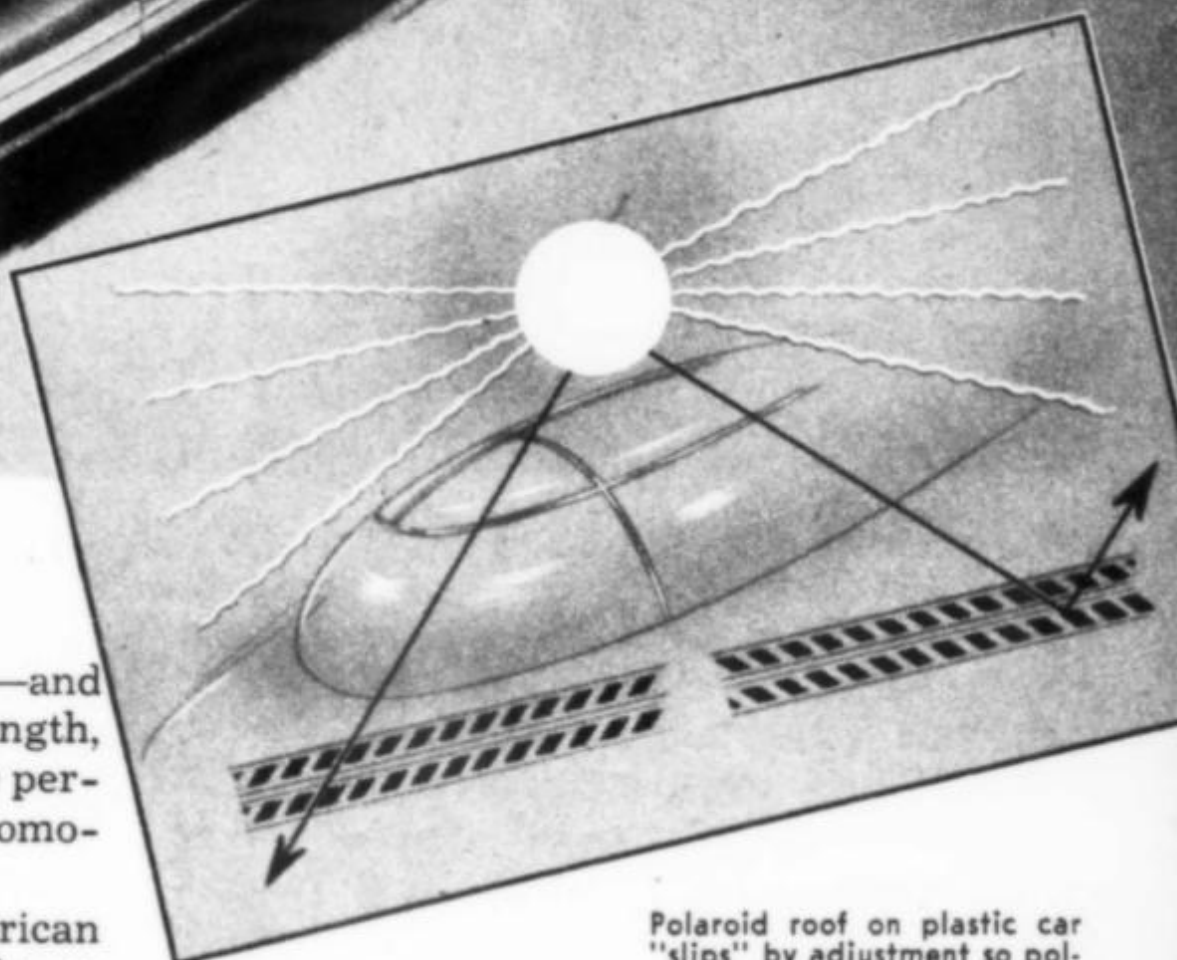
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E AUTOMOBILE



Here is all-plastic car in operation. Note single-beam headlight, lucite side-lights, all-around bumper. Plastic roof can shut out light (see right).



Polaroid roof on plastic car "slips" by adjustment so polarized glass shuts out light.

bomber, riding on fragile-looking wings—and your car will have fighter-plane strength, thanks to light metal alloys that will save perhaps half a ton of weight in a single automobile.

Jeeps, tanks, planes and other American tools of victory are teaching engineers things they wouldn't have learned in a dozen years of peacetime research. All this new knowledge is shaking industry to its very foundations, upsetting old ideas of doing things, shaping the inevitable day after the war when motor-makers will race to give the car-hungry public a product it never knew before.

And, more important, since the automobile industry has been converted to war production, it has scrapped all its old dies and tools. So, when Peace comes, they will start from scratch with hundreds of new and amazing ideas.

Already the ideas of engineers on tomorrow's motor cars are crystallizing, though they are far from frozen. From hundreds of different sources—corporations, engineers, inventors, research laboratories—MECHANIX ILLUSTRATED has collected those ideas, studied trends, and built a composite picture of tomorrow's car. Martial & Scull, noted New York industrial designers, have designed two

new automobiles incorporating many wartime improvements, which are presented herewith (on pages 40, 41 and 43) to give you a "preview" of your first peacetime car.

It's *your* car, or will be when peace comes. You may be a little startled when you stand before it and study its sleek, unfamiliar lines. First you notice its shape, not unlike an elongated egg, blunt in front and tapering to the rear. The hood is shorter than you expect, rounding into a pleasing streamlined nose in which the fenders are included. There is simple ornamentation but no elaborate die-cast grillwork, and the bumper is a wide strip of white metal that runs entirely around the front and perhaps continues to the rear.

The sloping windshield, curving around the driver, sweeps back gracefully and the roof appears to be of glass, for the forward half of it is transparent. All you can see of the rear wheels is the lower circumference of the tires,



Swivel easy chairs with let-down arms feature new car's interior. New generators make air conditioning possible. Food and drink refrigerator, for baby's milk, is fitted in air-conditioning unit in front.

for the body encloses all working parts in a smooth streamlined shell. Even the bottom of the car is a continuation of the body, flat and smooth, with drive shaft, girders, oil pan, and differential protected from dust and dirt.

The driver's compartment is strikingly like the nose of a bombing plane, made of transparent stuff supported by narrow tubular members. You notice that there are no projecting door handles—merely flush metal buttons which control the latch.

As you step forward for closer study you put your hand on the body. It feels queer. What is the stuff? When you tap it, it doesn't ring like metal but seems to be sound-absorbent. It is not painted; its color seems to run right through it. You learn quickly that it's a plastic body—grown on a hundred different farms, perhaps, compounded of resins, soy beans, cotton, wheat, straw, pine chips, or dozens of other ingredients. It dawns upon you that what you thought were glass windows are plastics too, of a different family, clear as crystal.

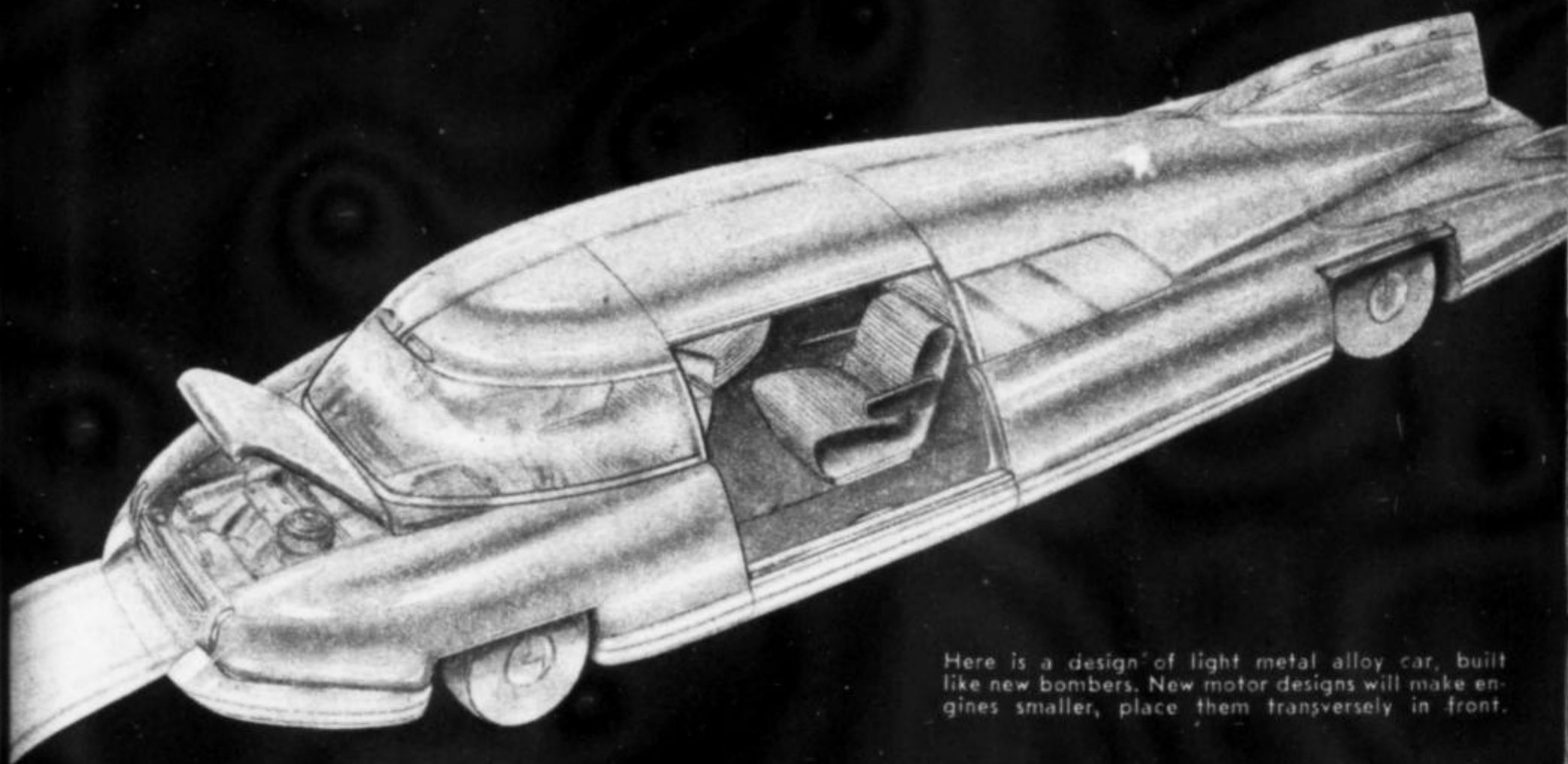
The interior holds further surprises. The side walls are smooth and clear, without window cranks or door levers. The floor is flat, without bumps—and where did all the room come from? It is as large as a good sized room and the impression is heightened by the fact that the "furniture" is arranged in living room style. You can have the chairs arranged in

any way you wish, for only the driver's seat is fixed. Perhaps you would like a love-seat in the rear quarter, or swinging chairs like those in parlor cars, or—in some families—a seat for the backseat driver facing permanently to the rear.

Colorful upholstery on the seats appears different from what you are accustomed to. It is. The fabric is an artificial "wool" made from soy beans or cottage cheese, or a synthetic fiber impregnated with resins, or a cloth spun from glass, either of which can be cleaned quickly of dust and stains by wiping with a damp rag.

You slip under the wheel and are amazed to see that the road ahead is visible almost to the instant it is swept up under the front wheels. There is no clutch pedal. The plastic windshield curves around you as it does in a bomber, and the corner post is so narrow that there is no dangerous blind spot. Through the transparent roof above you it is easy to see suspended traffic signals, but you want privacy so you turn a control and a polarizing device, or an integral curtain, makes the roof opaque.

The half-width instrument panel in front of you fascinates you with its gadgets. The speedometer, ammeter and gas gauge are familiar enough, but other controls are strange. One of them says "Air Conditioner" and you learn that this unit is located under the hood in front of you, instead of the engine, and that



Here is a design of light metal alloy car, built like new bombers. New motor designs will make engines smaller, place them transversely in front.

the spare tire, tools and other units are stored there, too. Now it is plain why there are no window cranks—weather conditions are controlled within the car and there is no need to lower the windows.

A dream-car indeed—but how much will it cost?

About \$700 for a light car, is the best guess of engineers. Some super-optimists place the figure as low as \$300. For a super-duper luxury car in the Packillac class the figure may be as high as \$2,000.

But this quick preview gives you only a faint idea of the prize package you're getting. Perhaps you think a plastic body will crack like an egg. Henry Ford has already exhibited a cream-colored plastic car which, struck by a sharp axe in the hands of a husky man, shrugs it off without dent or blemish. Surprisingly, such a plastic has ten times the impact-strength of a sheet-steel car. If you drive into a tree, your plastic car has ten times the resistance ability of steel. That bumper around the front is more psychological than anything else.

Ordinary bumps and sideswipings which would dent steel fenders leave no mark on plastics because they have natural resilience. A severe enough blow will crack plastic, of course, but will not leave the jagged, tearing edges that make sheet steel cause such frightful injuries. When you do ruin a plastic fender

or door, just tear it off and put on a new one. It will be cheaper than the present process of hammering out and repainting dented steel. Plastic bodies will be built on the panel system—Ford's experimental car has fourteen of them—so that only the damaged section need be replaced.

Because plastic surfaces are glass-smooth and the color is built right into them, you'll never need to repaint your car. If it is encrusted with mud, wash it down with a hose. Otherwise merely wipe it off with a damp cloth and it will never scratch.

Ever cuss and fume when you tried to drive with a windshield coated with frost? Plastics will make defrosting devices obsolete. You can't fog or frost the transparent plastics Uncle Sam uses on his planes. Way up in the stratosphere around 30,000 feet temperatures dip to 60 below, and you can be sure that the Army wouldn't stand for frosted windshields that shut out all view of the enemy. But the new plastic-glass just doesn't fog!

Most of us have had the experience of parking a closed car on a hot day and coming back to find the interior hot enough to bake a cake. But not plastics! Their insulating properties are such as to make a car cooler in summer and warmer in winter. They admit the health-giving ultra-violet rays of the sun which ordinary glass shuts out, but keep out the red heat rays. One motor-car executive who spent

most of his vacation at the wheel of an experimental car with a transparent plastic top came home with a rich coffee-brown suntan.

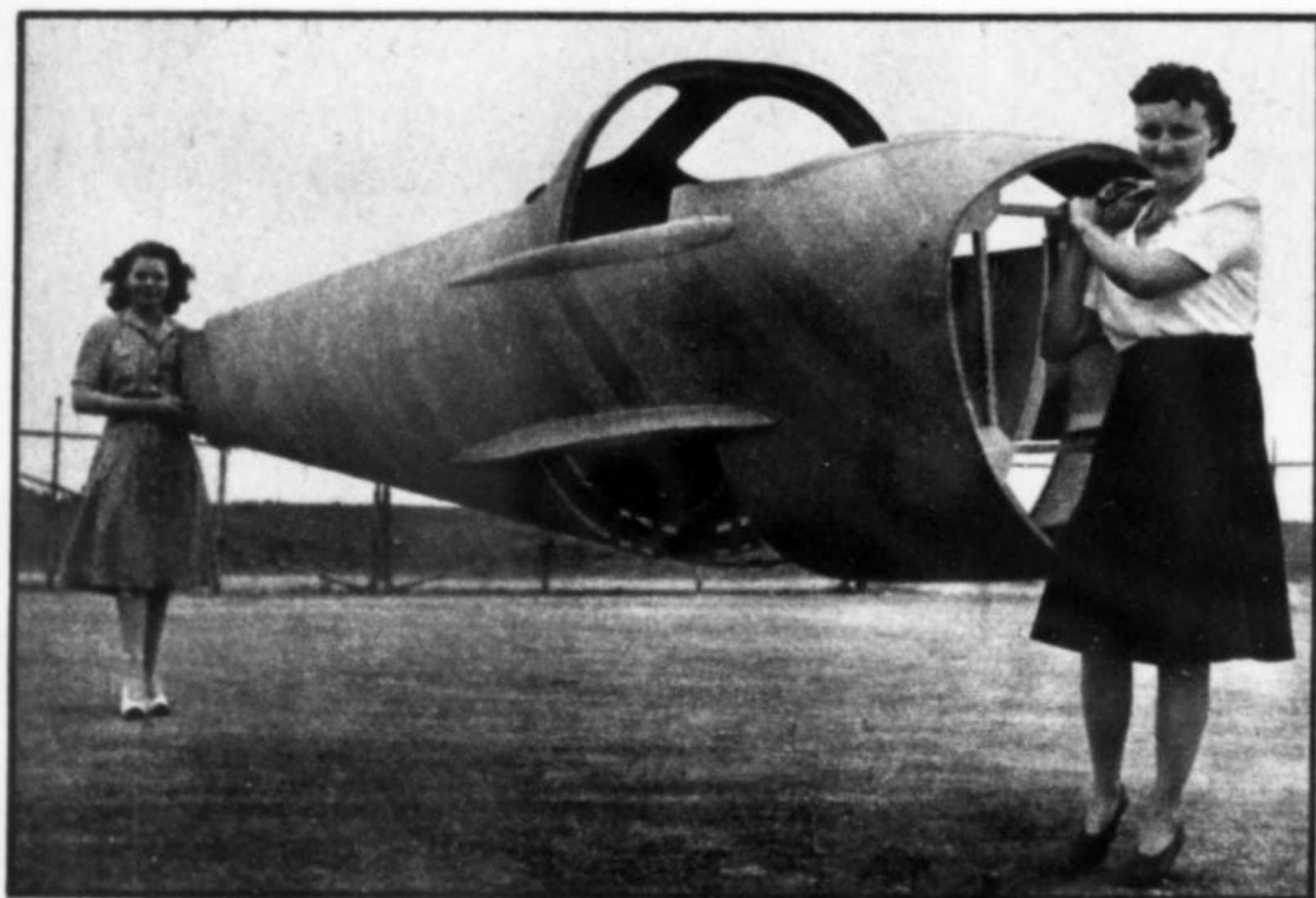
For quietness a plastic body won't need to be doped up with sound-deadening substances. It is accoustically inert and deadens vibrations. Imagine a body that can't develop squeaks and rattles! And as for weight: Well, the Vidal Corp. is now making an entire plane fuselage of plastic which weighs just 54 pounds!

Do these advantages mean that plastic bodies are going to have everything their own way? Not at all! There are hundreds of plastics and there will be competition among themselves. Black plastic is one of the easiest to work with, and this means that some plas-

tic cars may be coated with baked enamel coverings to give desired colors.

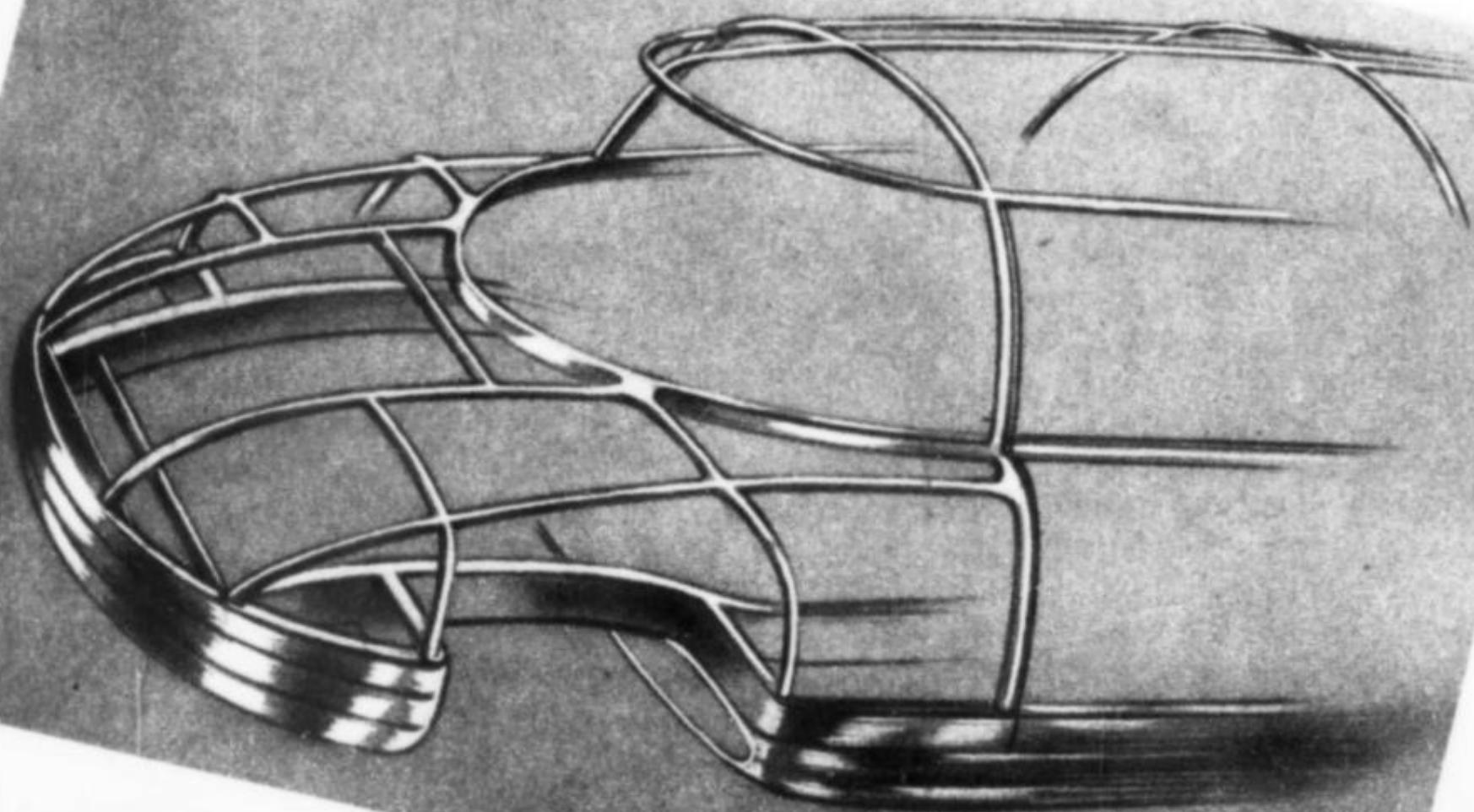
But the real competition will be between plastics and light metal alloys—aluminum and magnesium. Certainly we will have some cars with magnesium and aluminum bodies, because of the tremendous increase of production of these metals in war time. Plastics themselves must be mounted on tubular framework because they have less tensile strength than steel. General appearance and features of an aluminum car will not be significantly different from plastic models. Either design will reduce weight.

Airplane makers may be the ones to produce light-alloy cars. They're the world's experts in working with light metals, and new



Here is an all-plastic plane fuselage weighing only 54 pounds. It will be possible to make motor bodies by the same process.

New welding processes will revolutionize automobile frame design after the war. Below is all-tubular metal alloy construction.

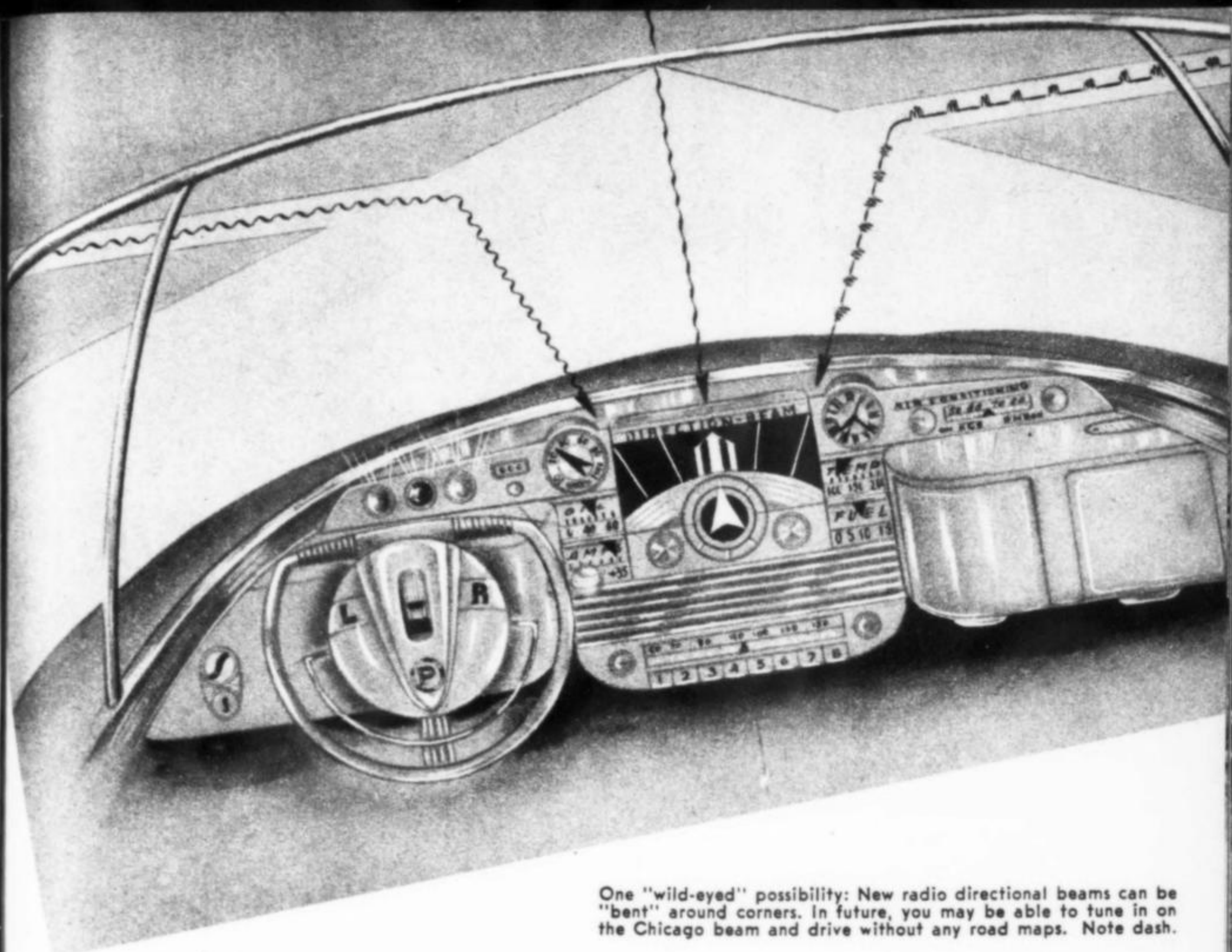


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One "wild-eyed" possibility: New radio directional beams can be "bent" around corners. In future, you may be able to tune in on the Chicago beam and drive without any road maps. Note dash.

defense plants are turning out these materials in terrific quantity. It is anticipated that aircraft builders, having learned the secrets of astounding mass production, will compete with old-line auto makers right in their own back yards after the war. Certainly aerodynamic design will come into its own—a car already designed for Packard is distinguished by two vertical fins at the rear, like the rudders of an airplane, to give it added road steadiness.

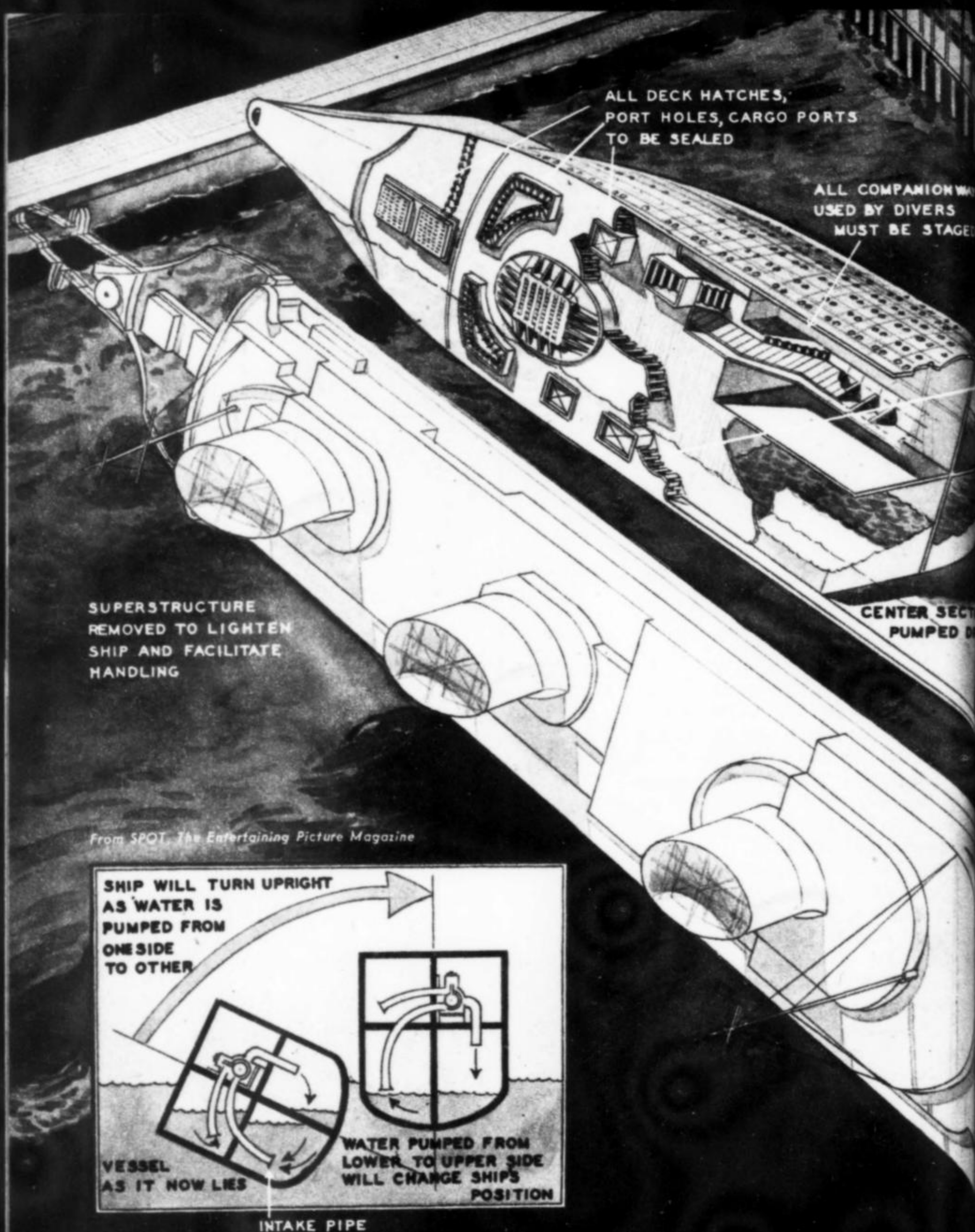
Lightness will come not only from body design but from the new chassis. Here, although steel will still be used for many essential parts, light metals will have a field day.

The tremendous strength necessary for a fighting plane has paved the way for auto chassis girders, engine mounts, and structural members of magnesium and aluminum alloys.

Moreover, these will not be manufactured in the old bolt-and-rivet fashion. Welding is revolutionizing construction practices. One workman is now able to put frame members into jigs, touch a button, and weld the separate pieces into a single unit strong as a bridge. There will be no bolts to come loose, nothing to rattle. And the labor cost will be greatly reduced. It is even probable that the entire frame of the car [Continued on page 147]

YOUR NEW HOME AFTER THE WAR!

Next month, MECHANIX ILLUSTRATED will present the second in its series of "A World You Never Knew" articles. The second will tell you the marvels of the new home some 20,000,000 of you will build in America when the war ends. It will show graphically the wonders which "rush research" on housing methods during the war have created—houses that are marvels of scientific precision and beauty. By Donald G. Cooley, with illustrations by MARTIAL & SCULL and NORMAN BEL GEDDES! Don't miss this sensational article!



Raising The Normandie

160,000 tons of dead weight are being lifted in the biggest salvage job ever attempted in history.

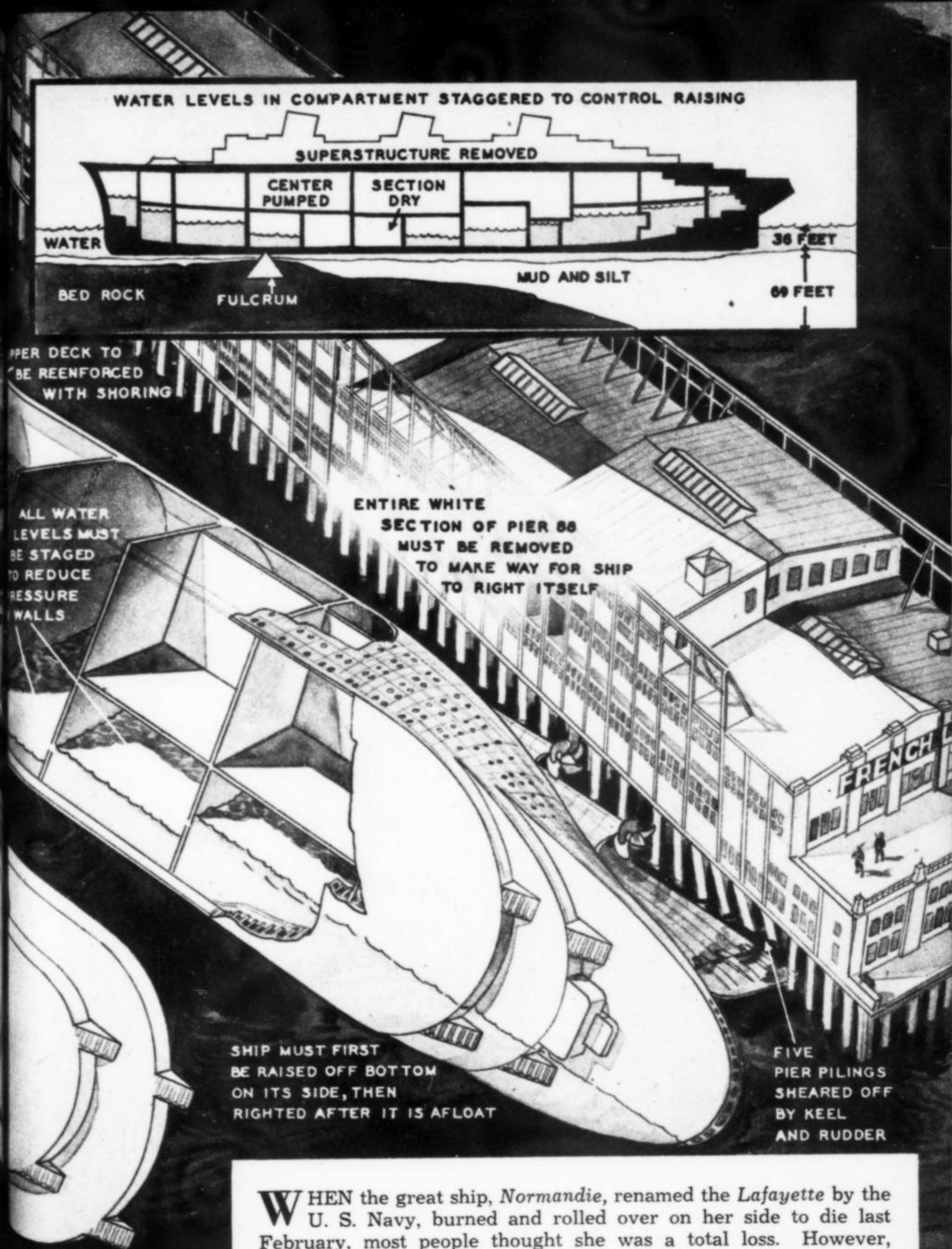
Mechanix Illustrated

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WHEN the great ship, *Normandie*, renamed the *Lafayette* by the U. S. Navy, burned and rolled over on her side to die last February, most people thought she was a total loss. However, engineers have worked out the ingenious system pictured here to right her. After sealing all ports and openings, they will remove the superstructure, clean out all debris, then start pumping her out. Water will be pumped to different levels in various sections to balance her properly, then to roll her upright, as shown.

The Secret of Axis Strategy

THAT the Axis plans definitely to dominate the world is known to most people. But the plan they have evolved, have followed and have brought to within some four-fifths of successful completion is realized by few. Yet the outlines of the plan have been plainly drawn by an entire school of German geo-political writers. And those outlines have been followed by every move the Axis has made so far.

I propose to explain here the startlingly simple scheme which explains all Axis strategy.

The groundwork of the plan, strangely enough, was laid by an Englishman, Sir Halford Mackinder, who in 1904 warned his



Nazis started the war by capturing "The Heartland" of their "World Island." But next they seized the European Coastline.



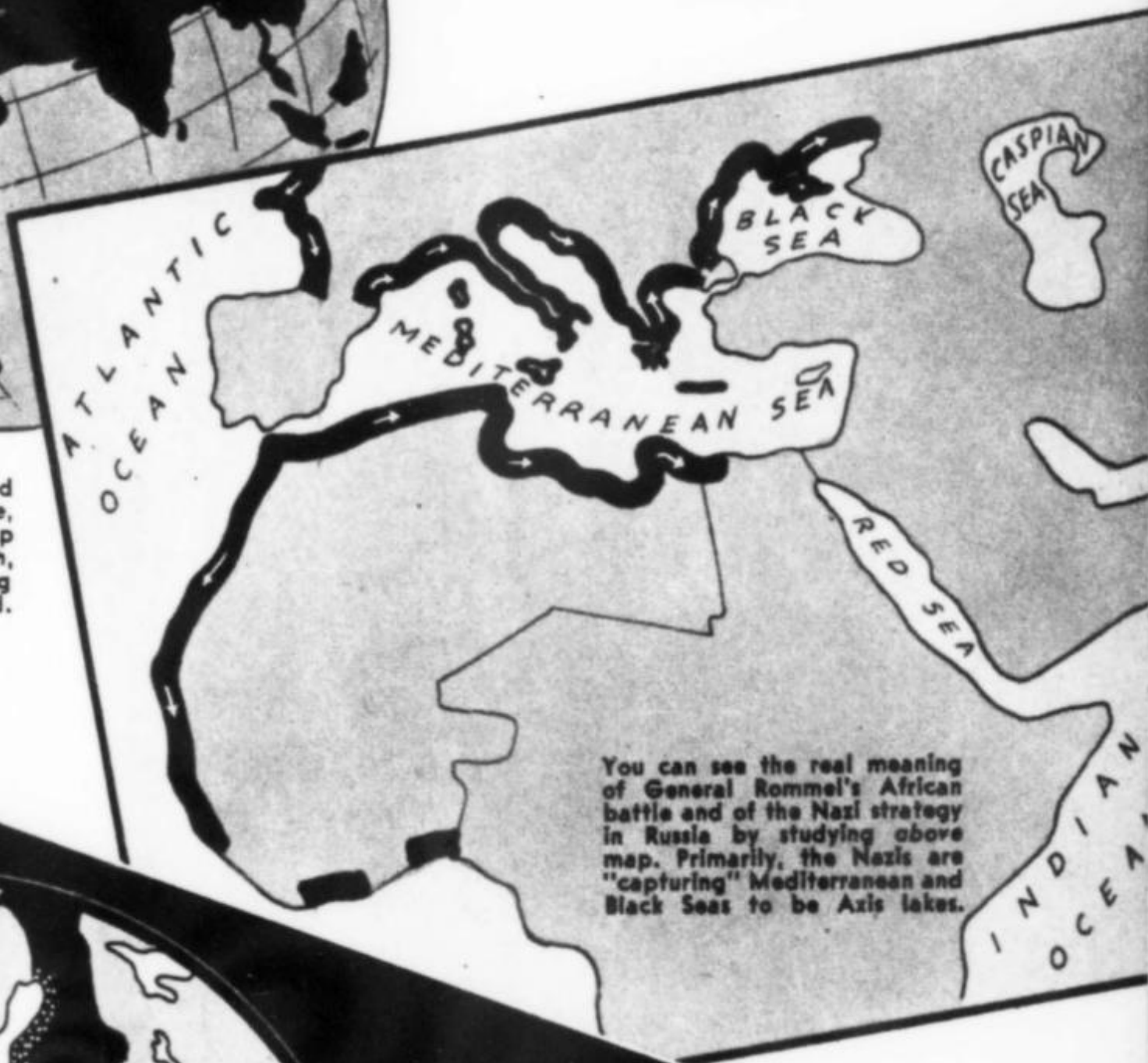
Nine-twelfths of our earth is water, as these spheres show. Prior to this war, control of the seas meant control of the world. But now the Axis has evolved a new strategy of "surrounding" the seas by marching around coastal areas. In four maps above, note how all moves follow the coastlines.

A "March Around The Oceans" is the key to all Axis successes, this expert says.

by Major Malcolm Wheeler-Nicholson



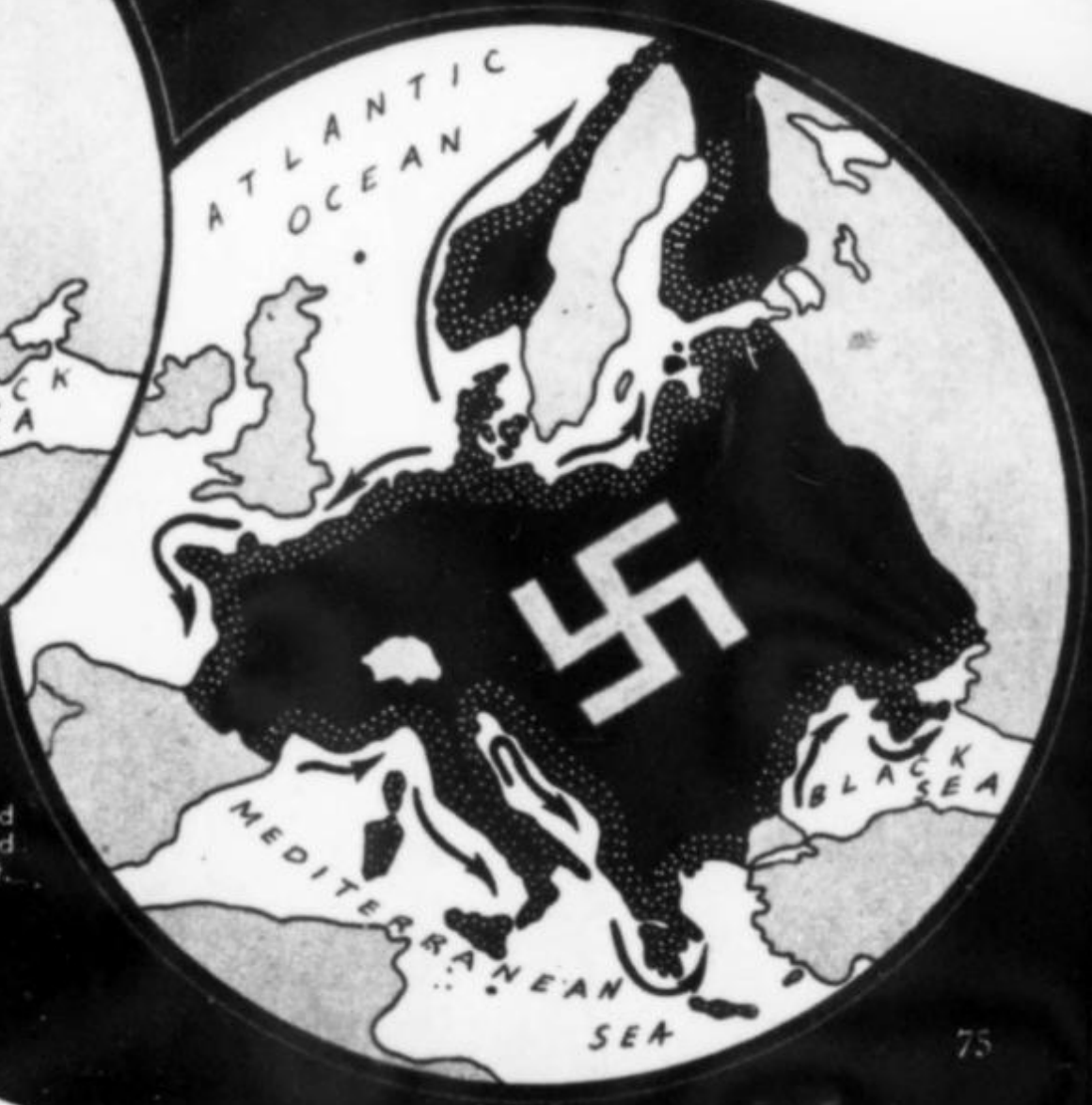
Nazi Geo-Political writers recognized that the "World Island" shown above, of Europe, Asia and Africa, makes up two-thirds of all land areas on earth, and calculated that by controlling coasts they could control the world.



You can see the real meaning of General Rommel's African battle and of the Nazi strategy in Russia by studying above map. Primarily, the Nazis are "capturing" Mediterranean and Black Seas to be Axis lakes.



Watch the dotted white coastlines spread as Nazis continue their "March Around Sea." Every Axis move follows coast.





The Japanese war plan has followed the Nazi scheme identically, as the series of maps here shows in consecutive detail. Starting at top, the maps show how Japs (black areas) secured their "heartland" in Manchukuo and northern China, then started spreading along the coastlines until they had "surrounded" the western Pacific Ocean, just as Nazis are "surrounding" the seas in their area. For a chilling preview of the ultimate aim of Jap and Nazi strategy, see top map opposite.

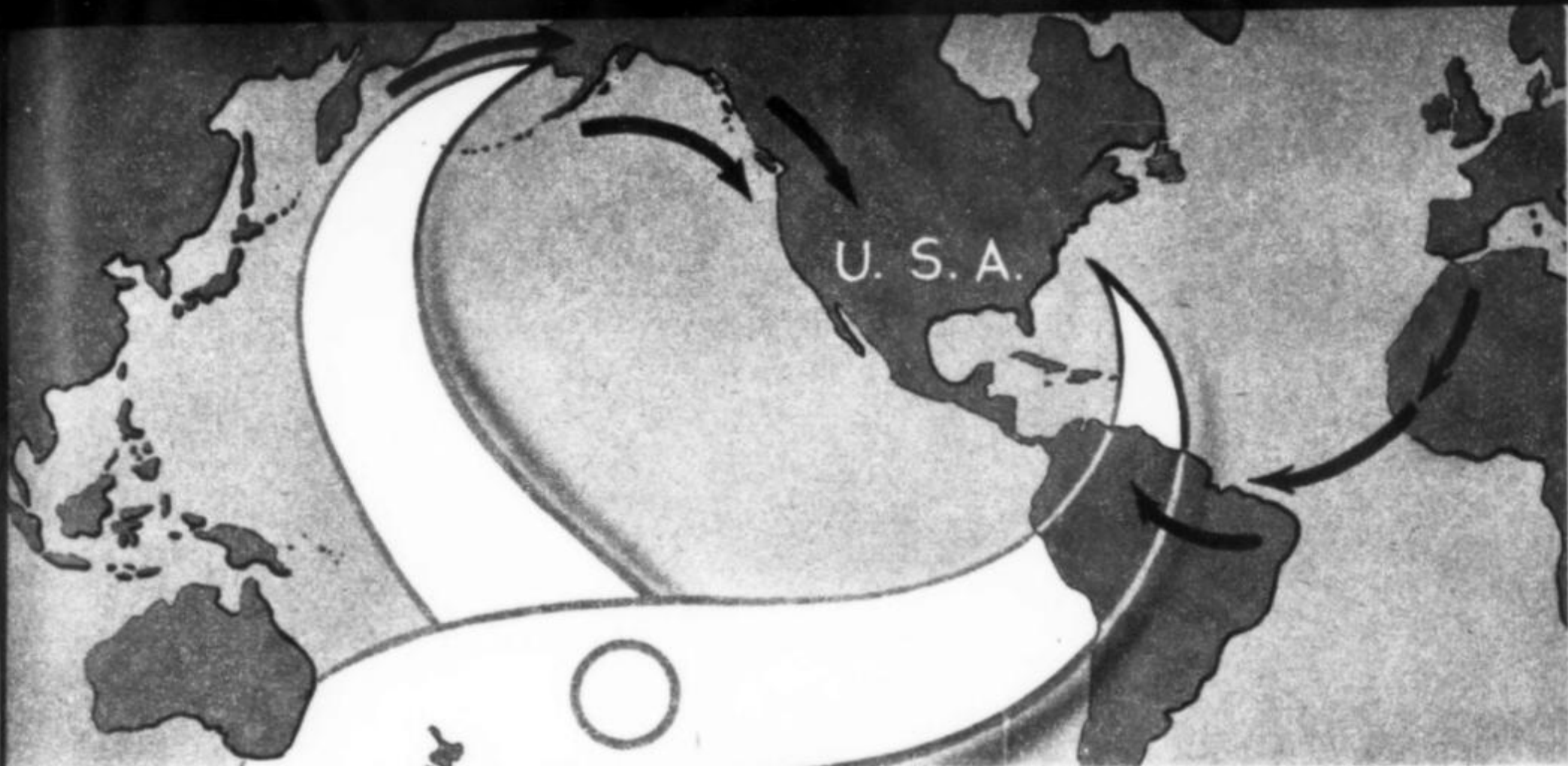
nation against the danger of a Russian-German military alliance.

Mackinder drew attention to the fact that the world surface is composed of nine-twelfths of water. Of the remaining three-twelfths of land, one-twelfth, only, is represented by the American hemisphere, Australia and the large islands of the Atlantic and Pacific.

The balance, two-twelfths of the entire land surface of the earth, is concentrated in the combined area of the continents of Europe, Asia and Africa. Study of a global map will confirm this.

Mackinder called this Eurasian-African land mass, the "World Island," considering Africa a huge promontory of this land mass. Under his theory, the total population of these three great continents, their combined raw materials and resources if properly exploited by a single group, could dominate the world. The area containing the dominant races he called the "Heartland," this being the area held by the Germans and Russians, as being the two land races of greatest population and resources.

Under his theory, these two nations under united command, could dominate the "World Island" and the "World Island" in turn



Here, according to the author, is the final plan of Nazi-Jap strategy. The Japs already have foothold in the Aleutian Islands off Alaska. The Nazis already have seized the coasts of Africa at Dakar. Joint moves will "pincer" us at our extreme defenses.

could dominate the rest of the one-twelfth of the land surface of the world in which the Americas and Australia and the islands of the sea were considered simply as satellite and relatively unimportant appendages.

The Germans, who since 1894, have maintained a body of scientists now known as the Geo-Political Institute who devote their studies to the problem of making Germany the dominant power in the world, seized upon this theory. Unsuccessful effort was made in the war of 1914-18 to secure this domination by opposing British naval power by German sea power, only to meet failure because the

two great Anglo-Saxon powers, Britain and America, combined their naval power and successfully resisted the German onslaught.

The indefatigable Geo-Political Institute then set about cooking up another scheme. This, in essence, was a study of the best means by which *land power could overcome sea power*.

It occurred to the Germans that sea power was absolutely dependent upon bases, a fact known to everyone. But the Germans went a step further. *If the bases, they reasoned, could be destroyed from the land side, sea power could be overcome.*

This conclusion led the Germans to their final plan. This plan was to overcome British sea power by German land power, by the simple expedient of "*marching around the oceans!*" It is important to keep this phrase, "*marching around the oceans,*" in mind as we proceed.

The plan was sound as far as it went.

But even at this stage it lacked something to make it certain of success. That something was supplied by an American.

In the early 1920's General William Mitchell announced his theory of the superiority of airplanes over battleships. He was bitterly condemned by his own [Continued on page 176]



MECHANIX ILLUSTRATED

A FAWCETT MAGAZINE

NOVEMBER
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HOW THE NAVY TEACHES
AERIAL GUNNERY
SEE PAGE 42

DEATH MISSED
FOUR TIMES

BY A WIRE CORRESPONDENT
IN THE SOUTH PACIFIC

NOVEMBER 1943

MECHANIX ILLUSTRATED

Title registered U. S. Patent Office

VOL. XXXI NO. 1

W. H. FAWCETT, JR., President

Editors: Roland Cueva Bill Williams

Associate Editors: George Daniels, Aviation; Thomas J. Naughton,
News; Gilbert Paust, Crafts & Hobbies; Mary Driscoll, Production.

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SPECIAL FEATURES

On the Cover: Closeup of the nose gunner of a Coast Guard Hall long-range patrol flying boat, with his heavy-caliber gun in firing position. The gunner is William M. Sikorski, 26, who has more than a year in the Coast Guard to his credit. Kodachrome by Rudy Arnold.

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U. S. Navy

ROBERT COLES

Noted astronomer, Assistant
Curator of the Hayden Planetarium

NEXT MONTH

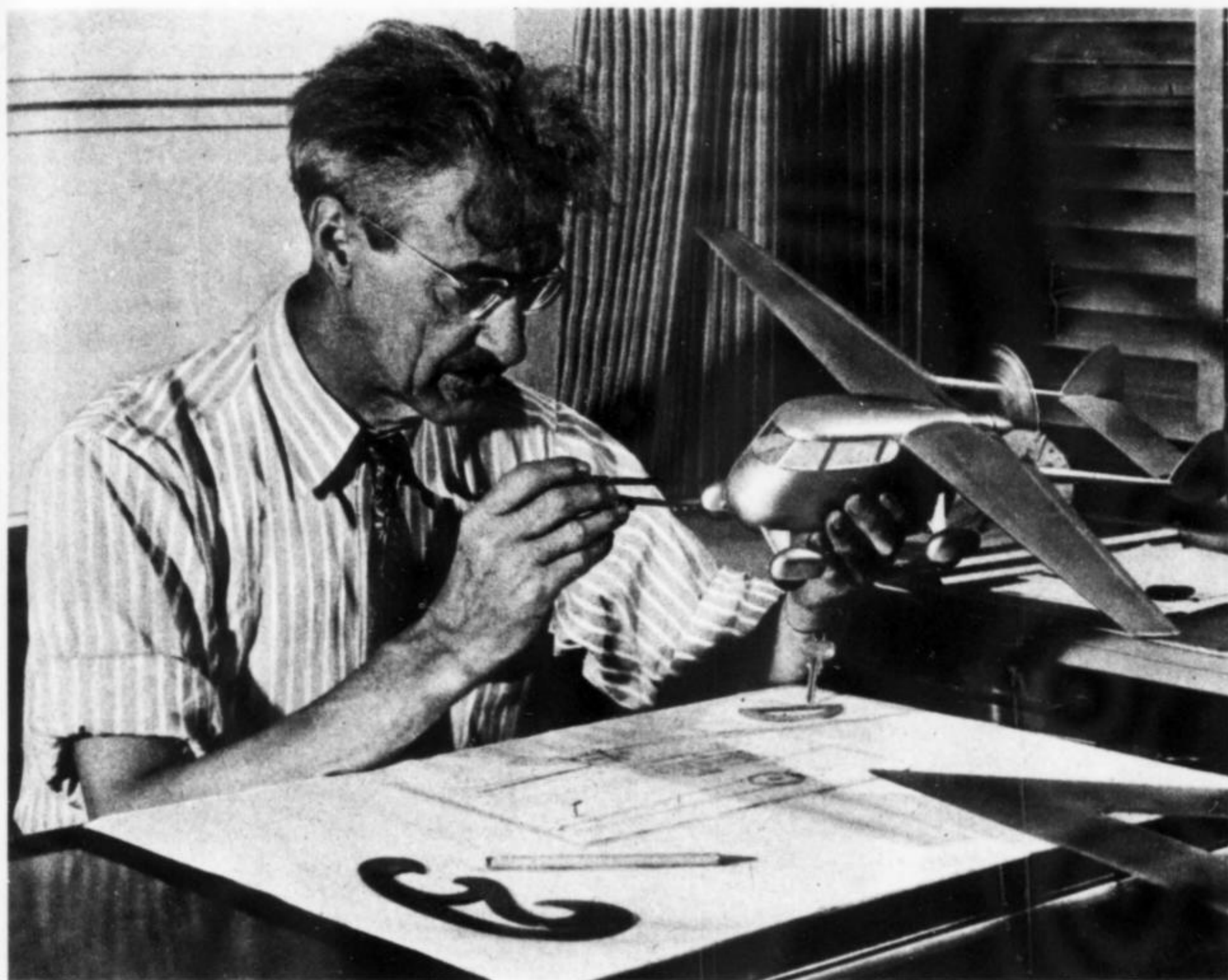
Inside Hitler's "Fortress Europe" the United Nations have allies who risk their lives every day fighting for freedom—they are the members of the Underground. When big British bombers by night, or American Flying Fortresses by day, roar out to hammer Axis factories and railroads, their crews know exactly where their targets are and what they look like, regardless of camouflage, because they have studied actual photographs of them—snapped and smuggled out by the Underground. When European patriots exterminate a prominent Nazi, their secret newspapers carry pictures of the dead Hun. Despite every attempt to confiscate cameras and films, despite the death penalty for possessing photographic equipment, the work goes on. How? MI will bring you the story in The Eye of the Underground, in the December issue. Don't miss it!



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MEMBER AUDIT BUREAU OF CIRCULATIONS

WILLIAM B. STOUT AND HIS WONDERFUL "SKYCAR"



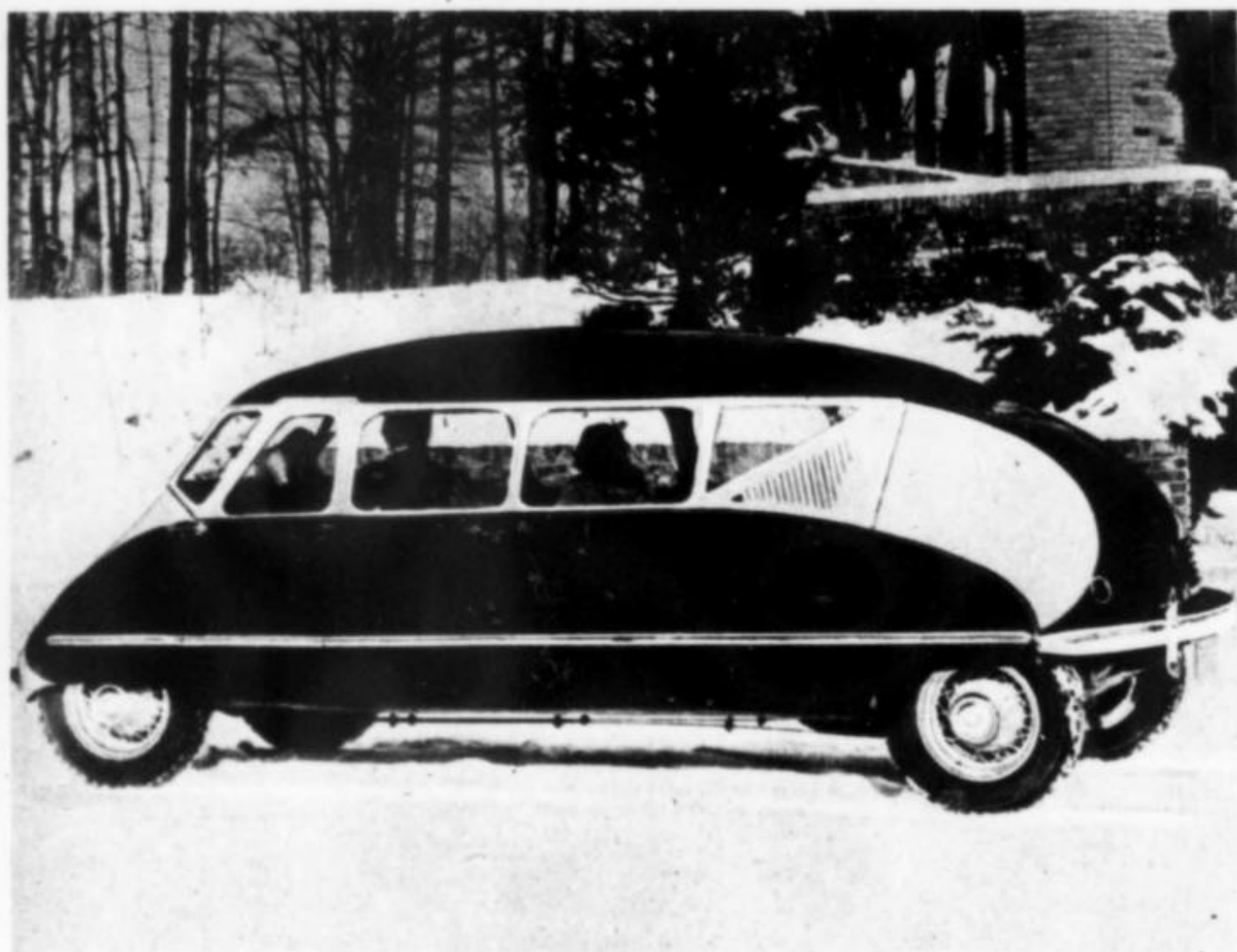
Genius at work: Bill Stout working on a model of his "Aerocar," an automobile with detachable wings, which he is designing for Consolidated-Vultee Aircraft for post-war manufacture.

by J. A. Greenberg

BILL STOUT, the genius of Dearborn, Michigan, has been responsible for more revolutionary innovations in the design and construction of automobiles and airplanes than has any other man, living or dead. Yet he has found time to create such minor novelties as the first gasoline-driven railroad car, the first Diesel-electric streamlined train, a streamlined motorbus lighter and faster than any then manufactured, a brick conveyor which saved thousands of dollars in building construction, an improved theater seat, an air-conditioned bed, and, among other things, a staggering number of mechanical toys. He

has been credited with more technical inventions than any man since Edison.

Now Bill Stout is in the news again, making the "experts" sneer and popping the eyes of the public. This time he has designed an "Aerocar" and a "Helibus" for Consolidated-Vultee Aircraft Corp. (see illustrations on next page). The Aerocar is an automobile with detachable wings which can be "parked" in the garage or at the airport when the Aerocar is being used on the road. Many technical noses will be lifted at Stout's design—but in the end, you can bet, we will all be riding in some contraption very similar to



One of Stout's more startling designs was the Scarab automobile, a teardrop car with engine in rear. Most of its more radical features have been adopted.

fondness for conversation. He will talk for hours, to tycoon or laborer, on every conceivable subject, throwing off ideas with prodigal abandon.

William Bushnell Stout, to use his full handle, was born in Quincy, Ill., on March 16, 1880, where his father, a semi-itinerant Methodist preacher, was temporarily anchored in the service of God. He was a frail, scrawny child, whose frequent illnesses caused despair for his survival to manhood. Still, when a critical childhood ailment laid low both Bill and his twin sister, it was the plump, husky little girl who died.

The sickly boy could not take part in the strenuous games of other children. Of all things, he wanted most to play ball with the boys, but his eyes were so bad that, as he tells it, he "couldn't catch a balloon with handles on it."

This early frustration drove him to making things with his hands. Wherever, in their frequent wandering, his father occupied a pulpit, Bill set up a crude workshop and embarked upon multitudinous projects, most of which remained unfinished. Thus began his experimentation with two toothpicks and a piece of string.

At high school Bill found his studies hard and the discipline irksome, but this trouble was happily solved by his transfer to the Mechanical Arts High School in St. Louis, where "Jack Knife" could pursue his already developed talent for tinkering.

Unhappy at Hamline University, where he first matriculated, Bill moved on to the University of Minnesota. With parental assistance difficult and unlikely, he was forced to support himself by running a laundry (an unsuccessful venture), by waiting on table, by teaching manual training, and by whatever other opportunities presented themselves. Once, when tending furnace for his board, he found it so unpleasant to run down five flights before dawn in the Minnesota winter that he rigged up a contraption of cords and pulley attached to the key of his alarm clock. Thus his laziness

mothered the invention of one of the earliest heat-regulating devices.

About this time he began to write about the mechanical toys which he had been making since early boyhood. His first article, sent to Harper's Young People, brought a prompt reply, a check for \$12 and a request for more of the same. Spurred by this munificent sum, which paid for more than two weeks' sustenance, he cudgled his brain for creations to write about. Eventually, it brought in enough money to put him through college comfortably.

By 1906, when he married Alma E. Raymond, he was writing a syndicated column for the St. Paul Dispatch. The advertising department got him a motorcycle on a due bill, but this machine was so bad that Stout designed his own with many improvements, not the least of which was a better engine. He probably had the first engine with two-speed gear on a motorcycle. Eventually he became an authority on the internal combustion engine.

His articles on aviation brought an offer from the Chicago Tribune to become aviation editor. He started a magazine called Aerial Age, organized a model-plane club for boys, and contributed to two magazines concerned with automobiles, until Dave Becroft, editor of Motor Age, induced him to join the staff on a full-time basis.

Aviation was pulling Stout like a magnet. Two years later he [Continued on page 145]

Mechanix Illustrated



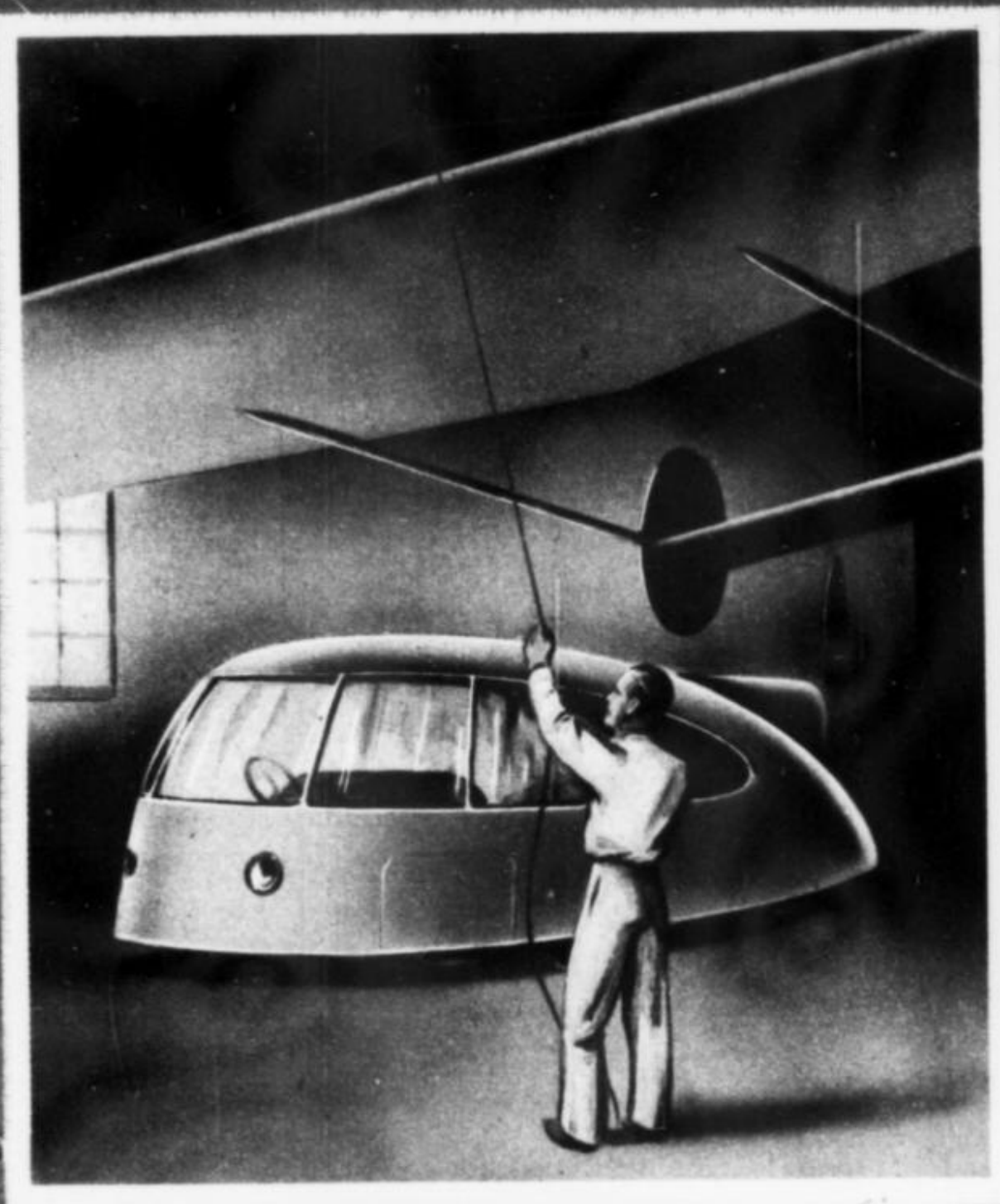
Stout's design for a helicopter (at left) looks like a teardrop on a stick. Its actual operation is similar in many respects to that of the Sikorski helicopter.

The Stout Aerocar (below) is actually a Scarab-type automobile with detachable wings which "clip" on to it and can be "parked" when not being used.

it. For all of Bill Stout's inventions follow the same routine: 1. Derision by the "experts," and, 2. Final adoption for general use a few years later.

A character and a legend in the automotive and airplane industries, he has been conducting a crusade against adherence to tradition and the formulae of the past since he graduated from the University of Minnesota thirty-five years ago. From all of which it may be gathered that Bill Stout has no overweening fondness for professorial conclusions. "Never resort to mathematics," he once said, "until you have exhausted the possibilities of two toothpicks and a piece of string." The key to his technique is disclosed by a motto prominently displayed on the wall of his drafting room: "SIMPLICITE AND ADD MORE LIGHTNESS."

Called "industry's most whimsical and unpredictable inventor" (an appellation he does not like), he is amiable, informal and easy-going, always smiling and completely free from affectation. His figure is spare and not too strong-looking, his features lean and bony, with a thin mustache and a wild thatch of hair through which he is continually running nervous fingers. He bears a striking resemblance to Fritz Kreisler, the eminent violinist, though there is a whimsical reminder of Groucho Marx in his mouth and eyes. Characteristically midwestern and homespun, he is voluble and restless, never in a hurry and ready at any time to indulge a cracker-barrel



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APRIL
1941

Volume XXV
Number 6

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DR. GUY ROBEY

Dr. Guy Robey, leading authority on the modern science of protective architecture, and author of "Bombproofing America!" which begins on page 35 of this issue, started his career of public service as a country doctor. At the outbreak of World War 1, he volunteered his aid to the Allied forces

afield. Later when his emergency hospital was shattered by a shell, Dr. Robey organized members of a company of military engineers, rescued every surviving patient, and supervised the construction of an improvised bombproof dressing station. What little spare time he had thereafter was spent in research and study of the newborn science of protecting civilians and injured in time of war. Today, his work has won the undying gratitude of beleaguered millions in the war torn world.

Have you ever felt the urge to see just how fast your car would go?

Have you ever longed to go someplace where you could press the accelerator to the floorboard and let the old bus out, without fear of curves, crossroads, pedestrians or traffic cops? If you have, you'll get a big kick out of "Paradise For Sunday Drivers!" in our May issue.

This, and other exciting features, along with lots of interesting news shorts and a great How-To-Build section, help to make next month's issue something to write home about!

The new MECHANIX ILLUSTRATED is on sale at all newsstands the first of every month.

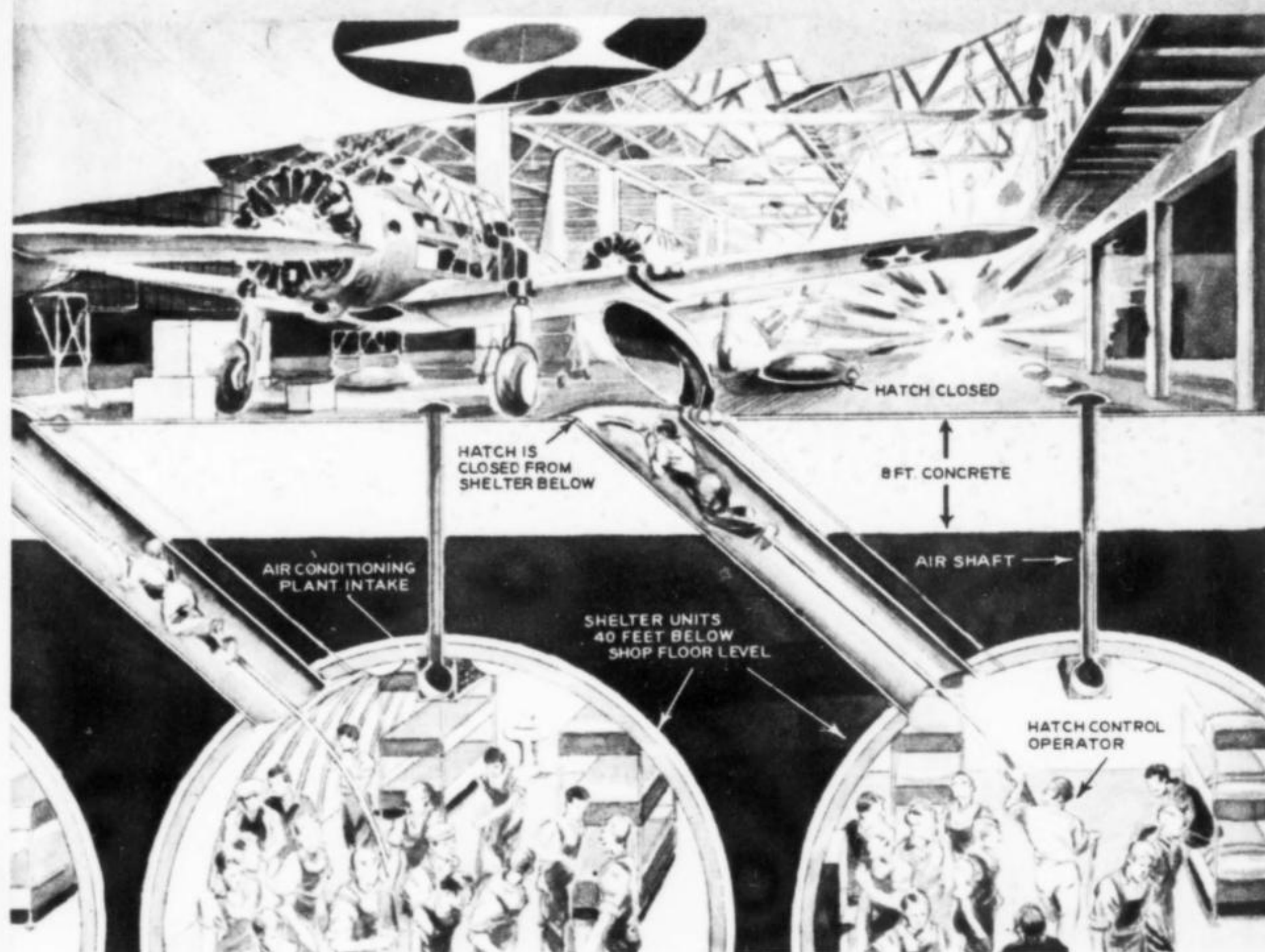
ROBERT HERTZBERG, Editor

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Bombproofing America!

America, birthplace of the airplane, and builder of the sky's mightiest war craft, is taking no chances! With examples abroad to profit from, the United States builds "blackout" aircraft factories, tremendous underground shelters for workers, and even private bombproofs. Despite protective oceans, U. S. plays safe!



Far below the great factories that build America's defense, immense, bombproof, gasproof shelters will stand ready to protect the thousands of workers from any possible raid. In the drawing above, workers slide to safety.

by Dr. Guy Robey, P.R.L.

BACK in 1670, a Jesuit named Francesco Lana had a vague premonition of the horrors of today's air attacks. Although he developed some sound principles of flight, he ended his aircraft investigations early and concluded his explanation by saying "—God would surely never allow such a machine to be successful, since it would create many disturbances in the civil and political governments of mankind."

Now, centuries later, man has made such a machine, and it is indeed creating the many disturbances Lana warned about. A great

American surgeon, Dr. Philip D. Wilson, returns from the bombed, blazing holocaust abroad to tell us, "It is the civilians who suffer the most." Eighty to ninety per cent of those injured in the wreckage of exploding buildings die!

What Is Bombproof?

The United States wisely looks to bombproofing and to determining just what is *really* bombproof. Very few of the usual places of refuge are safe from direct hits. The

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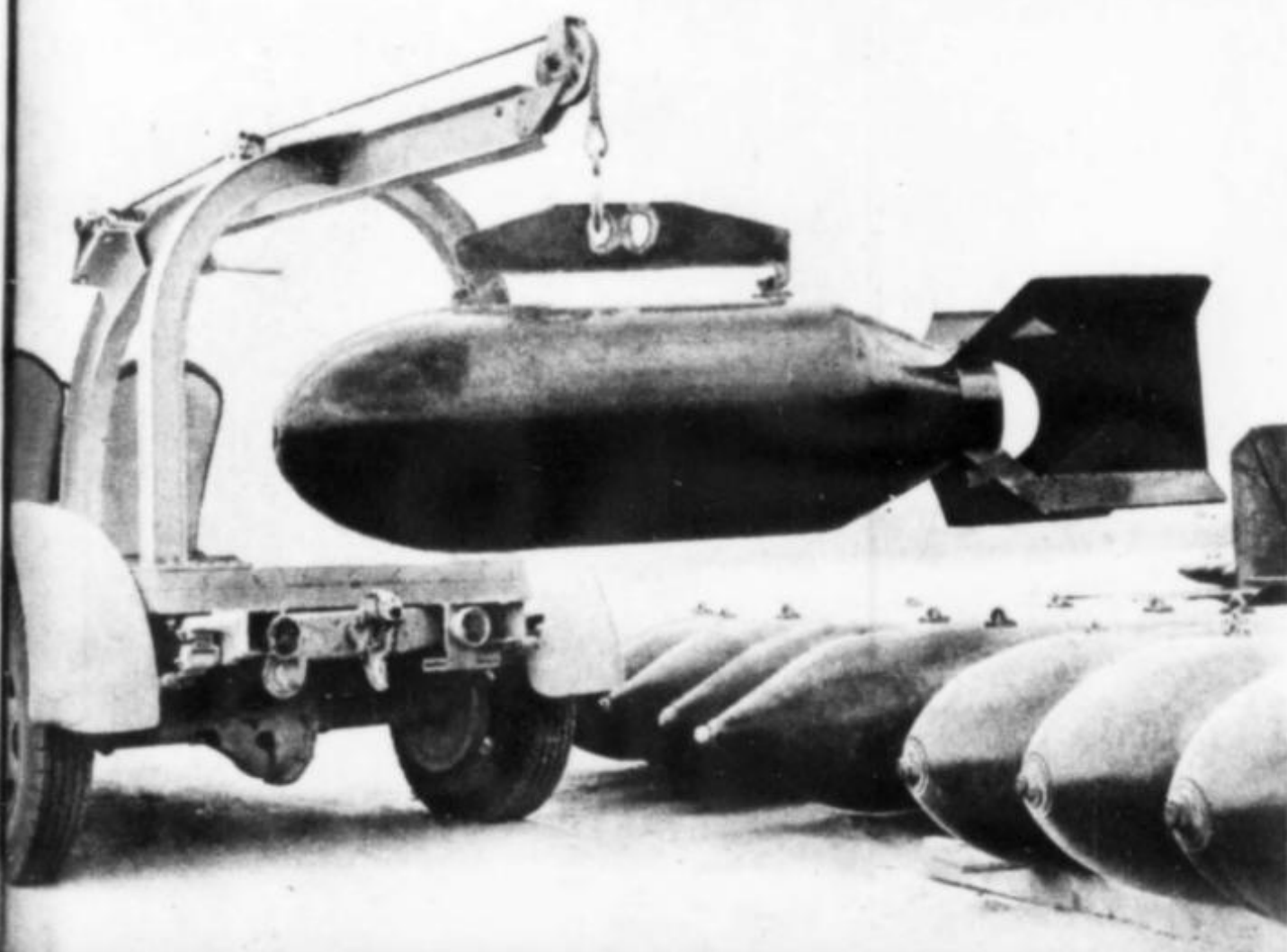
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Daytime camouflage will give this appearance to the bombproof Douglas factory at Long Beach, a blackout plant.

Light traps will shield the entrance and exit of the thousands of workers changing shifts through the night. As the gleaming, mass-produced war planes roll from the teeming assembly lines they will be loaded on special trains *inside the building!* Later, fully loaded freight cars will move smoothly and silently through a light-tight double door system, to be whisked across the enveloping blackness by high speed locomotives toward their ultimate destinations.

Don't drop it! Nearly a ton of TNT makes this "egg" definitely the hard boiled kind.



Eleven separate buildings will house the larger units, decentralizing the major elements of this immense production center. Beneath the 1,422,350 square feet of working space, far below the massive concrete and steel structures, gigantic bombproof shelters will provide ample room for the comfortable accommodation of the entire personnel of the factory!

Every unit will be fully air conditioned and artificially lighted. Duplicate utility services will be provided, to cope with any possible emergency. The exterior of the plant will be camouflaged with a specially prepared paint, designed to make it blend into the surroundings. Trees and shrubbery adjacent to the buildings will be cropped square with the building tops and other structural elements. Many other features which cannot be revealed will add to the protection of the plant and its estimated 15,000 employees.

The east coast, likewise, has by no means over-



This 1899 Packard afforded almost perfect driving visibility.

Seeing Things In

THE ghost of the horseless buggy haunts the drawing boards on which tomorrow's cars will be born. Revived by the suggestions of Dean Fales, of M.I.T., at a recent meeting of the Society of Automotive Engineers, the chugging spook of yesteryear shows the designers the way to better driving visibility. Surprising as it seems, even the steering of the modern car did not escape Mr. Fales. Along with visibility, comfort, road clearance, and ventilation, steering must also be brought nearer to perfection in the high speed cars of the future.

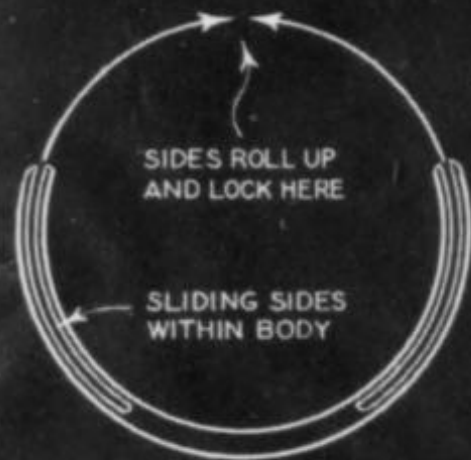
The long hoods and steeply inclined windshields of today's low slung cars limit the view of the road to a far greater extent than did the design of vehicles of 1899! The reduced road clearance increases the likelihood of modern cars getting "stuck" in snow or soft mud. The small wheels increase the likelihood still more. The easy-steering ratios require little effort in normal driving but call for much wheel spinning in emergencies. The one remaining danger to be eliminated arises from the possibility of carbon monoxide collecting in the tightly sealed bodies.

Mr. Fales advocates the pressure method

of ventilation as a preventive of carbon monoxide accumulation. This system has been employed with great success on many vehicles. Pleasure cars so equipped can be both comfortable and safe in inclement weather when windows are kept shut. As an additional comfort and safety combination, he urges the adoption of more adjustable seats. The reduction of fatigue brought about by the latter feature would enhance the motorists's alertness during long, tiring trips.

The car of the future will, for sake of safety, embody many characteristics of the early "horseless buggy." Chief among these will be near-perfect visibility. This improvement will necessitate a certain sacrifice in sleekness. In return, however, drivers of tomorrow will enjoy a new degree of comfort and safety in cars closely resembling those shown in these artist's drawings. The trend is already apparent in the three-wheeled "tear drop" car designed by Wellington Miller, of Los Angeles, and shown in both framework and complete form in the photographs. A similar practical and attractive design appeared as early as 1927 in the front wheel drive Dymaxion. Cars of this

A future solid-top convertible.
Note the moulded plastic "glass."



CROSS SECTION THRU BODY



Tomorrow's Cars

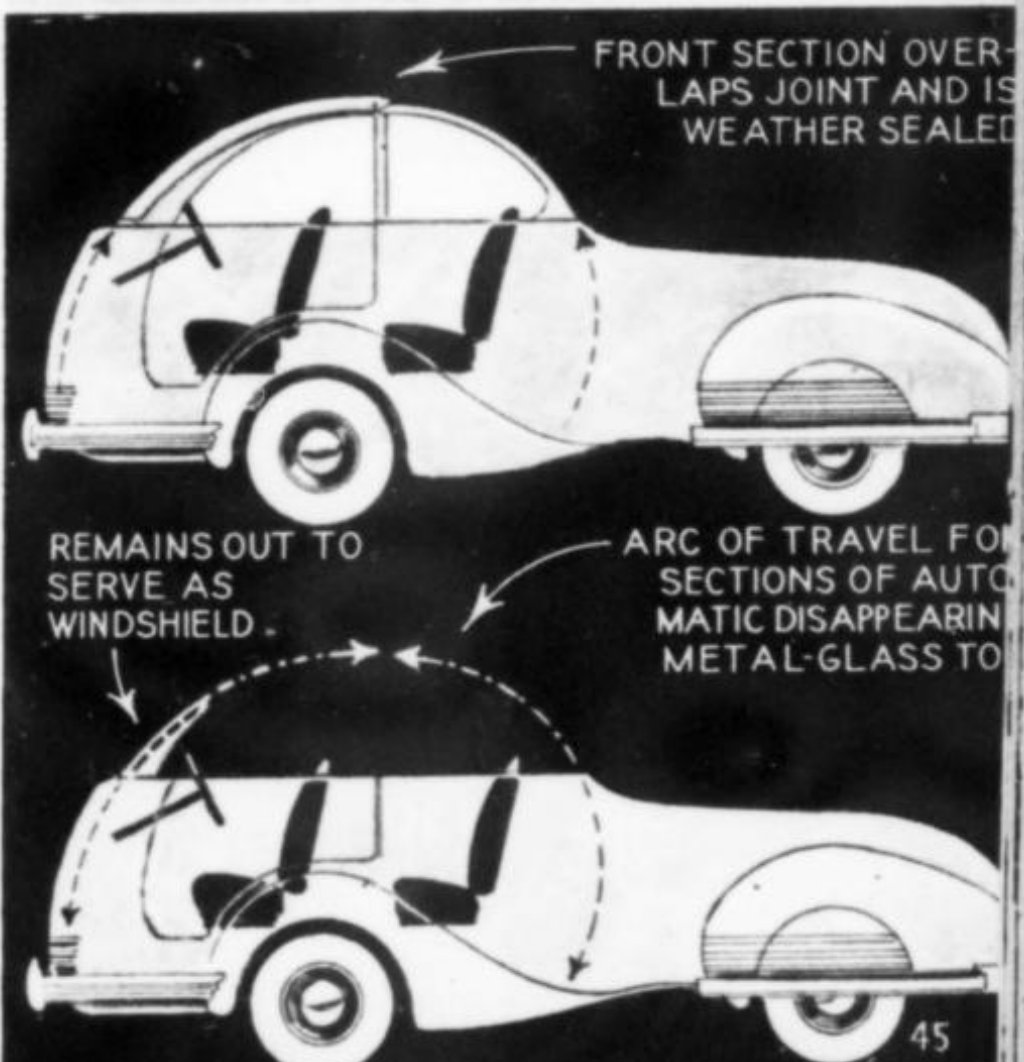
by George Daniels

type gain many advantages in comfort and simplicity by placing the engine in the rear, an arrangement that will undoubtedly prevail in cars of the future.

The rear engine design not only increases the usable space within the car, but also improves visibility by eliminating the hood. Moreover, any fumes from exhaust leakage or from the engine oil breather are carried away from the passengers instead of toward them. Another element of comfort is gained by the absence of the driveshaft tunnel in cars of this design. It is not imperative, however, that only three wheels be used. The engine may be placed in the same position with either three or four wheels.

Both the Dymaxion and the "tear drop" previously mentioned employed rear wheel steering. This unusual innovation proved entirely satisfactory and even showed certain advantages, particularly in parking. It is de-

Massachusetts Institute of Technology, long famed for its great contributions to progress, again takes the lead in the campaign to make tomorrow's world a better one. These amazing future cars are based on suggestions of Dean Fales, of M. I. T.



TOMORROW'S CONVERTIBLE COUPE MAY ASSUME THIS FORM — WITH PLASTIC TOP

Another form future streamlined convertibles may take.
April, 1941

batable, however, whether this development will obtain in the future. It is highly probable that the front wheel drive included in these present advanced cars will be dispensed with, in order to eliminate the lengthy drive-shaft. The engine will, no doubt, be coupled suitably to the rear axle. This will permit

conventional front wheel steering with its convenient simplicity.

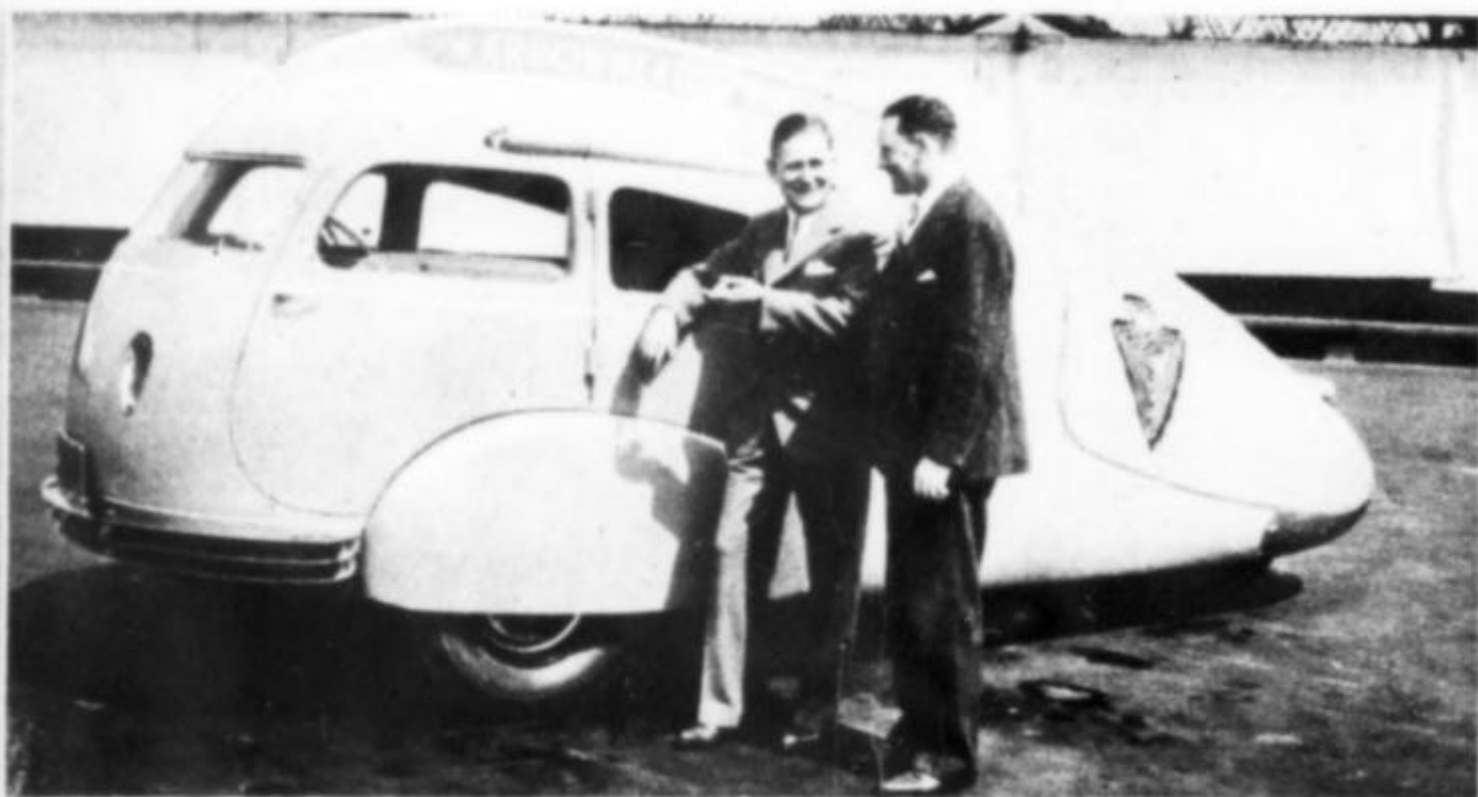
Although air cooled motors will probably become more common in automobiles, water cooling will have several advantages. By placing the radiator at the front of the car it will be possible to use the hot water to heat

the passenger compartment in winter. It will also permit more complete enclosure of the motor, an advantage in wet weather when ignition might otherwise be affected.

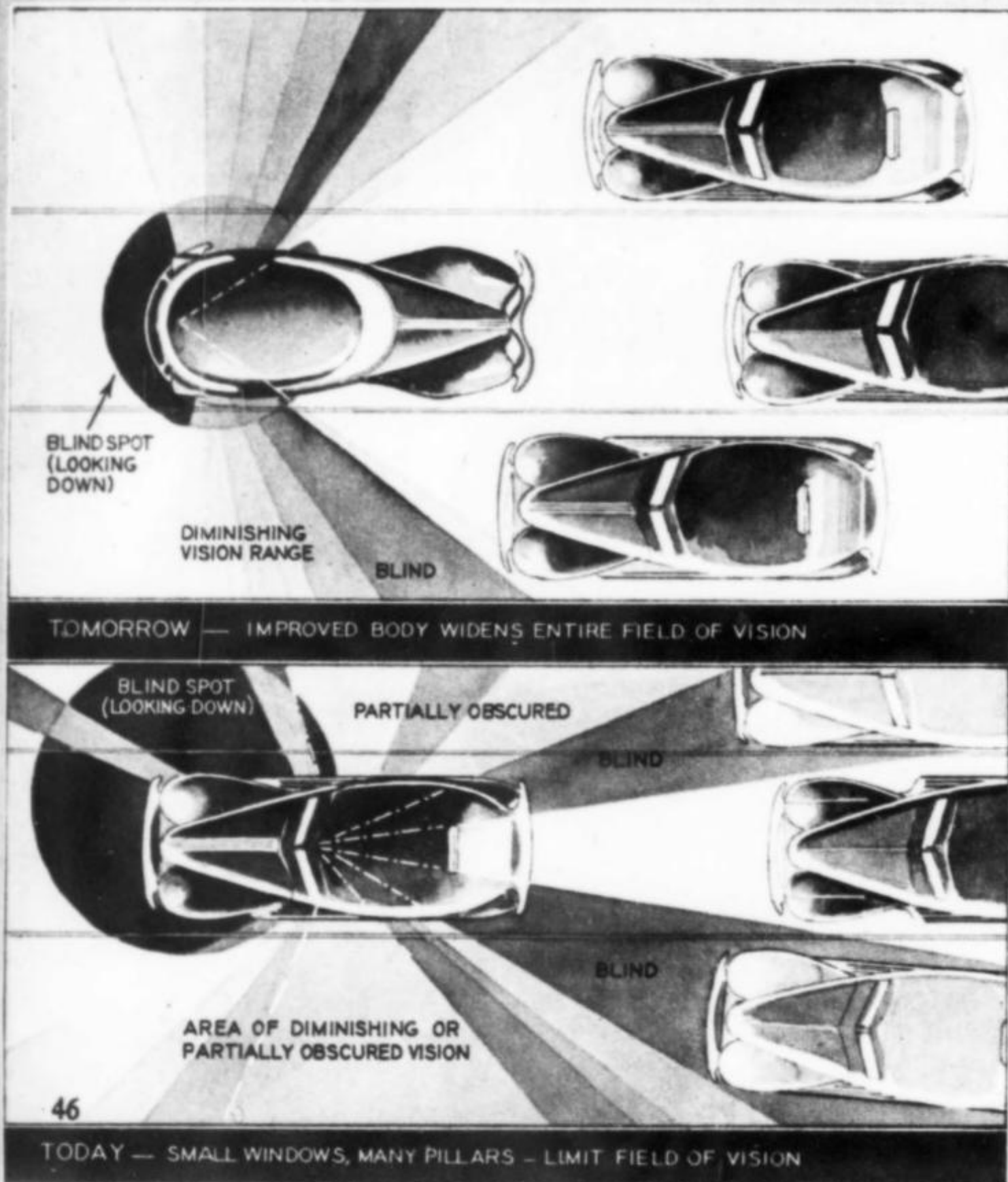
Although future cars will be higher than present day models, they will not necessarily have higher centers of gravity. The use of lighter materials in construction will enable engineers to design cars with a remarkable resistance to turning over. Broader tires and rims will aid this by eliminating the common tendency to "roll" on turns. Tires of this type may appear in the immediate future.

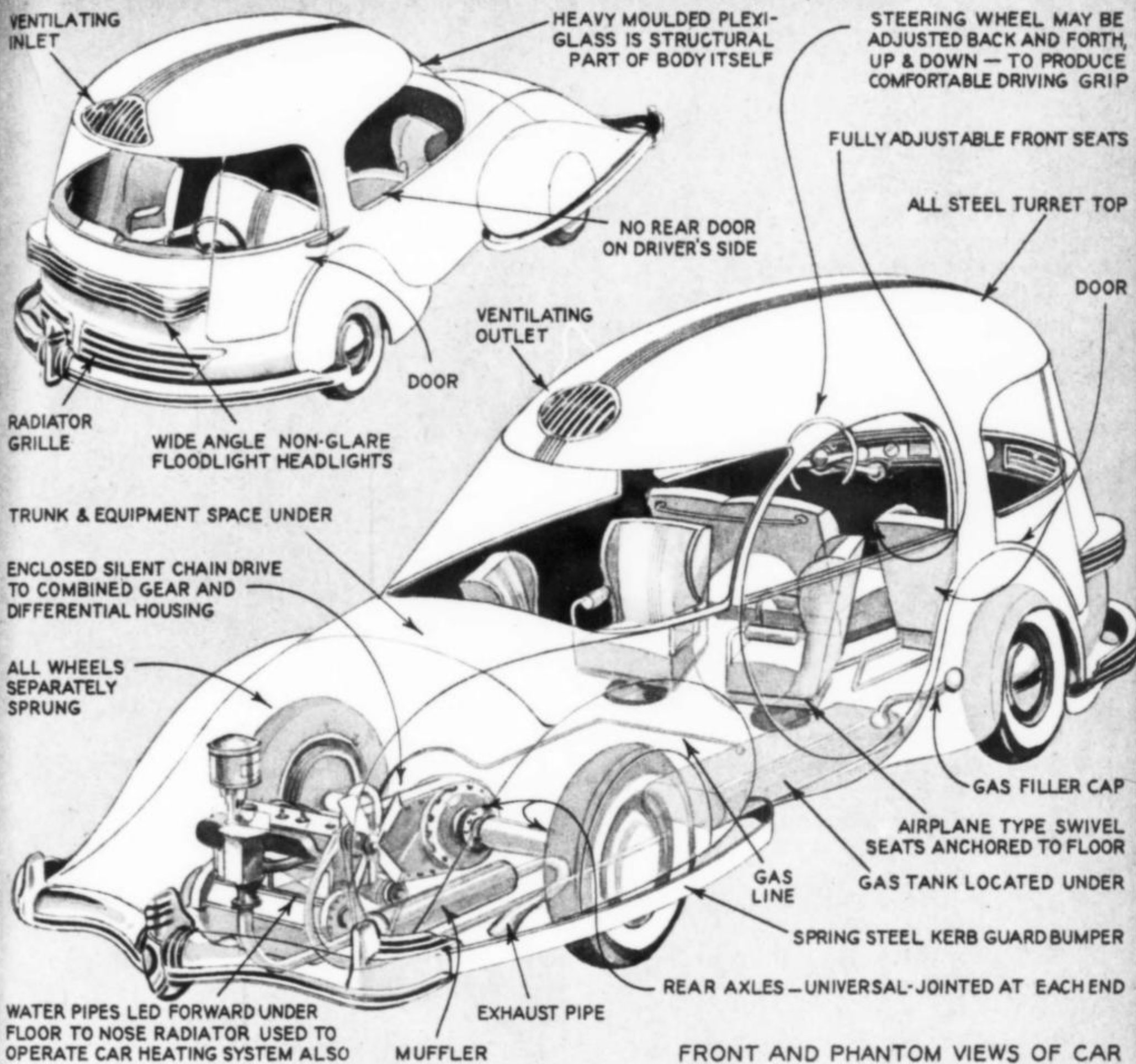
The increase in the height and size of the cars will not increase their wind resistance appreciably. Really efficient streamlining will be possible with future cars, due to the simplicity of design and the location of the power plant. Recently introduced transparent plastics are already making possible hemispherical windshields and nose windows on aircraft. This practice will naturally be carried into the automotive industry in the future.

The simplification of the exterior contours



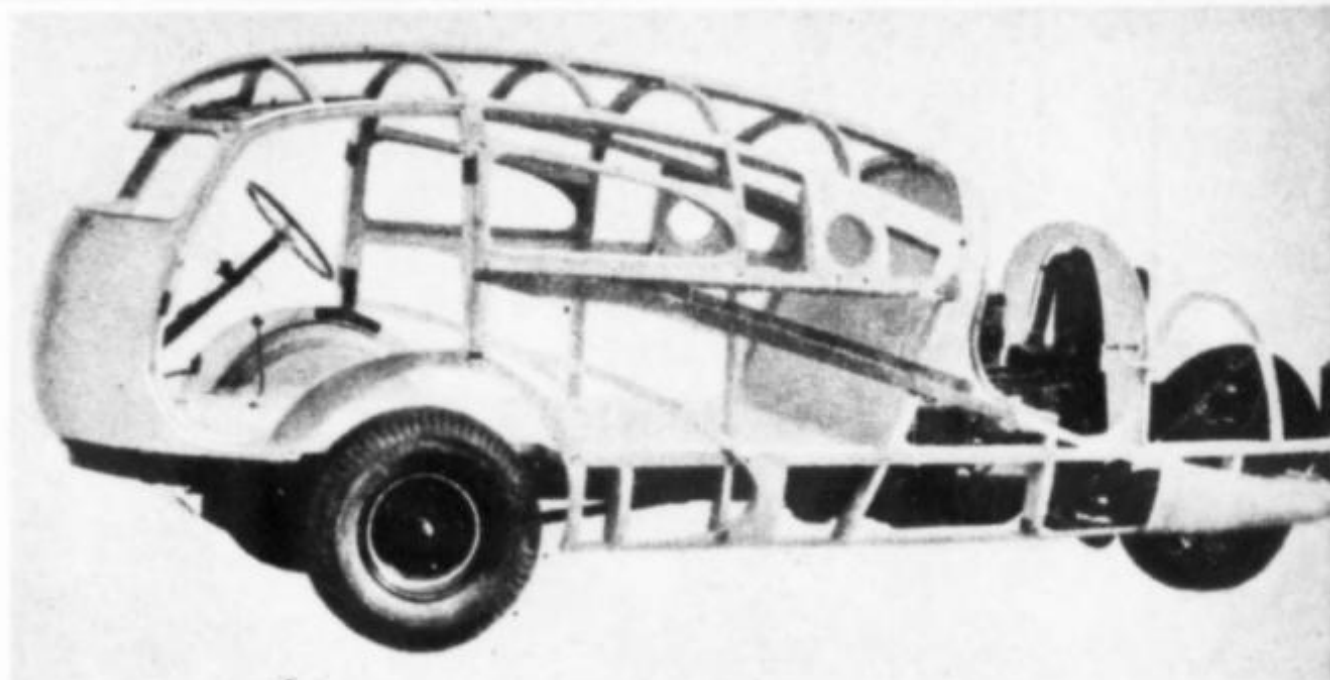
Above: A Wellington Miller design. Below: Today's visibility.





Above: Details of tomorrow's rear-engine car. Right: Framework of car shown on preceding page. Note location of seat.

of the body will eventually result in a lessening of manufacturing costs. It will also reduce the difficulty of repairing damaged panels. Washing, polishing and repainting will likewise be greatly simplified. The roominess of the cars of tomorrow will not only be an aid to comfort, but to safety as well. More passengers can then be carried without cramping. Plastic windows and windshields will practically eliminate the danger from these sources that has been so greatly reduced by present day liminated glass. Another contribution to comfort and



economy will perhaps come from the use of engines of different form from those in common automotive use today. The radial engine may be borrowed from the aeronautical world and adapted to the automobile.

This would add considerable useful space to the passenger or baggage compartments of the cars involved. Radial engines, being disc-like in shape, can either be mounted "flat" on the frame of the car, or set "on edge." In either position they take up less space than the familiar "V" or "straight" engines.

Increased application of rubber for damping vibration, absorbing shock, and eliminating noise, will permit the use of fewer cylinders without a sacrifice in smoothness of performance. Removable engines will appear as an aid to repair work. When motor trouble occurs, the motor will be quickly removed, and a "rental motor" installed during repairs, much as batteries are handled now. The same system will doubtless be applied to the other relatively complex mechanisms of the car.

It is reasonable to assume that the airplane "crash pad" will be more universally adapted to the automobile. Cushions of this type, placed at all danger spots throughout the car, would help greatly in preventing injury to occupants in the event of accident. Various modifications of the well known aircraft safety strap will also come into more general use.

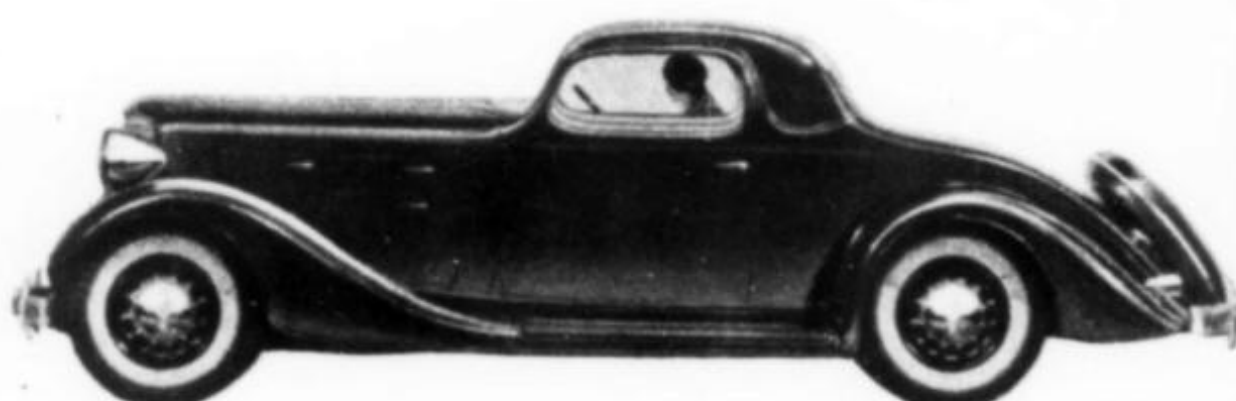
These devices, coupled with the other safety features mentioned previously, will make higher speeds possible. Cruising speeds of 150 m.p.h. will be easily possible and perhaps common. Those reckless adolescents whose mile-a-minute joyrides alarm the parents of today, will look like tortoises when compared to those of tomorrow. Insofar as the speed cops of the future will quite probably nab offenders from low-flying traffic airplanes, irate parents attempting to squash tickets for

their offspring will have their hands full. Excusing Jimmy Jr.'s 210-mile clip through the 100 m.p.h. zone will be no easy job—particularly if Jimmy had five people in the front seat when apprehended.

That may be borrowing trouble, however. It is highly probable that the major highways of the future will be designed to suit the cars and drivers of the time. Main arteries of traffic will, no doubt, be divided into numerous lanes for the various speeds attainable by pleasure cars and commercial vehicles.

A feature that has already been the subject of much discussion among lawmakers, the speed-governor, may make its appearance as compulsory equipment on every car used for instruction or practice. Such a device may likewise be required on cars driven by the lower grade licensees—as drivers' licenses may very well be classified in a somewhat similar manner to that of airplane pilots' certificates at the present time.

Visibility yesterday, today, and tomorrow showing limitations.

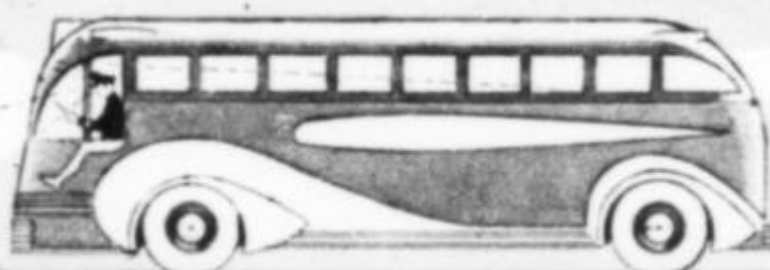


GOOD

IMPROVED

TOMORROW — COMFORT — PLUS ALL ROUND IMPROVED VISIBILITY

GOOD



POOR

TODAY — BUS DESIGN INDICATES TREND TOWARD BETTER VISIBILITY

PARTIALLY OBSCURED AREA DUE TO HOOD

ABSOLUTE BLIND AREA

POOR



POOR

TODAY — COMFORT — BUT ALL ROUND VISION DANGEROUSLY IMPAIRED

UNEXCELLED



SUPERIOR

YESTERDAY — DISCOMFORT — BUT ALL ROUND VISION SUPERIOR

These drawings show several familiar vehicles of the past and present as well as one of the future. The limitations of visibility are obvious in some of them. The favorable characteristics of others are equally apparent. Commercial vehicles of today show the right trend.

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After landing by parachute, troops of the 501st Parachute Battalion go into action with their automatic rifles.

SOLDIERS OF THE SKY!

TAKING a leaf from Germany's war book, the United States is now training parachute troops. The pictures on this page show members of the 501st Parachute Battalion, now in training at Fort Benning,

Georgia, learning their ABC's of parachuting.

The men receive thorough practice in handling parachutes, as well as in all other phases of operations required of parachute troops. Much of the practice is on the ground, simulating actual jumping conditions. After the troops are experienced in the handling of 'chutes on the ground, they make jumps in groups of two and three.



Above: Simulating actual jumps, these troops learn the rudiments by leaping from an imitation plane cabin. Right: The men learn how to land properly by using this special "trolley."



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OCTOBER, 1945

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On the cover: Rudy Arnold color photo of Grumman F7F Tigercat

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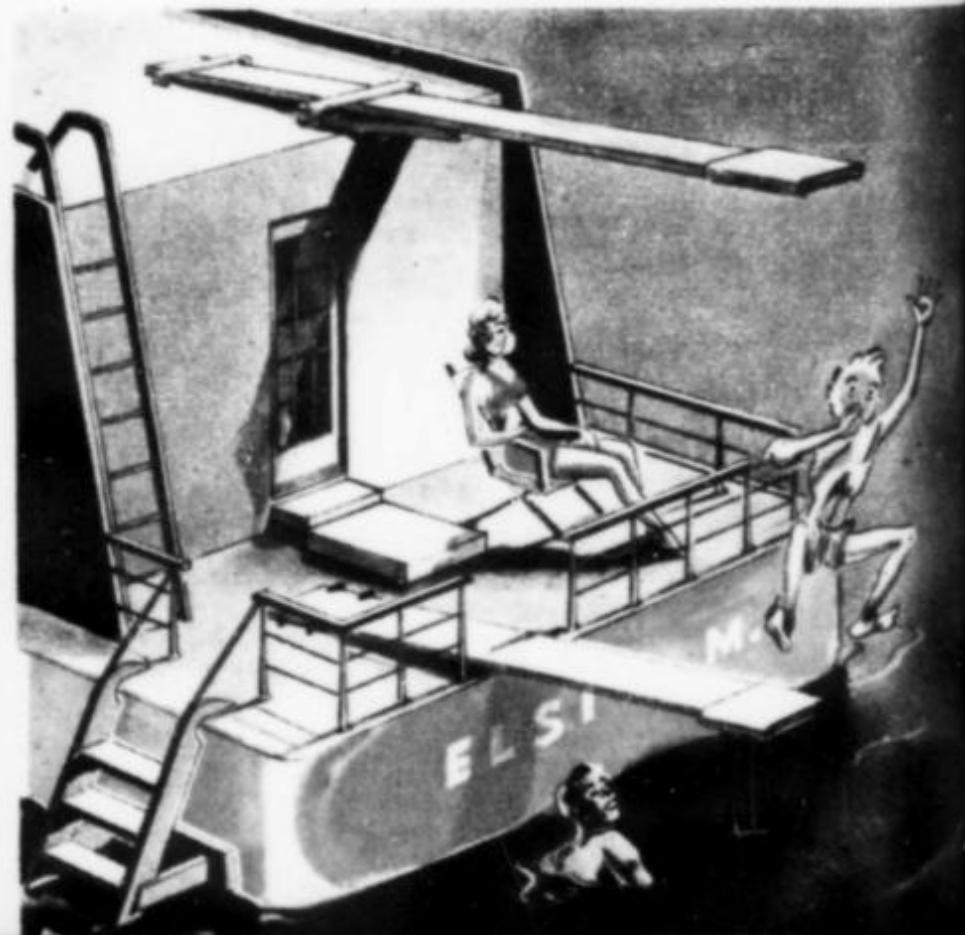
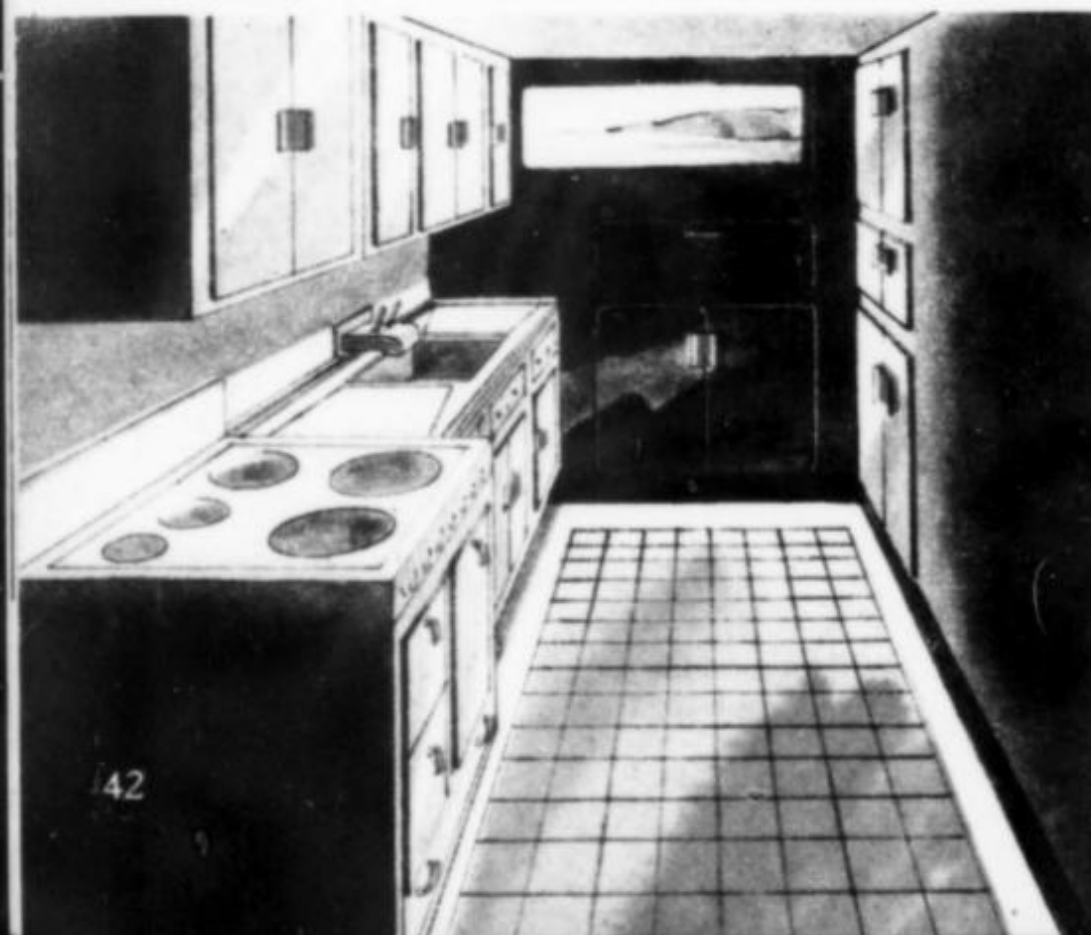
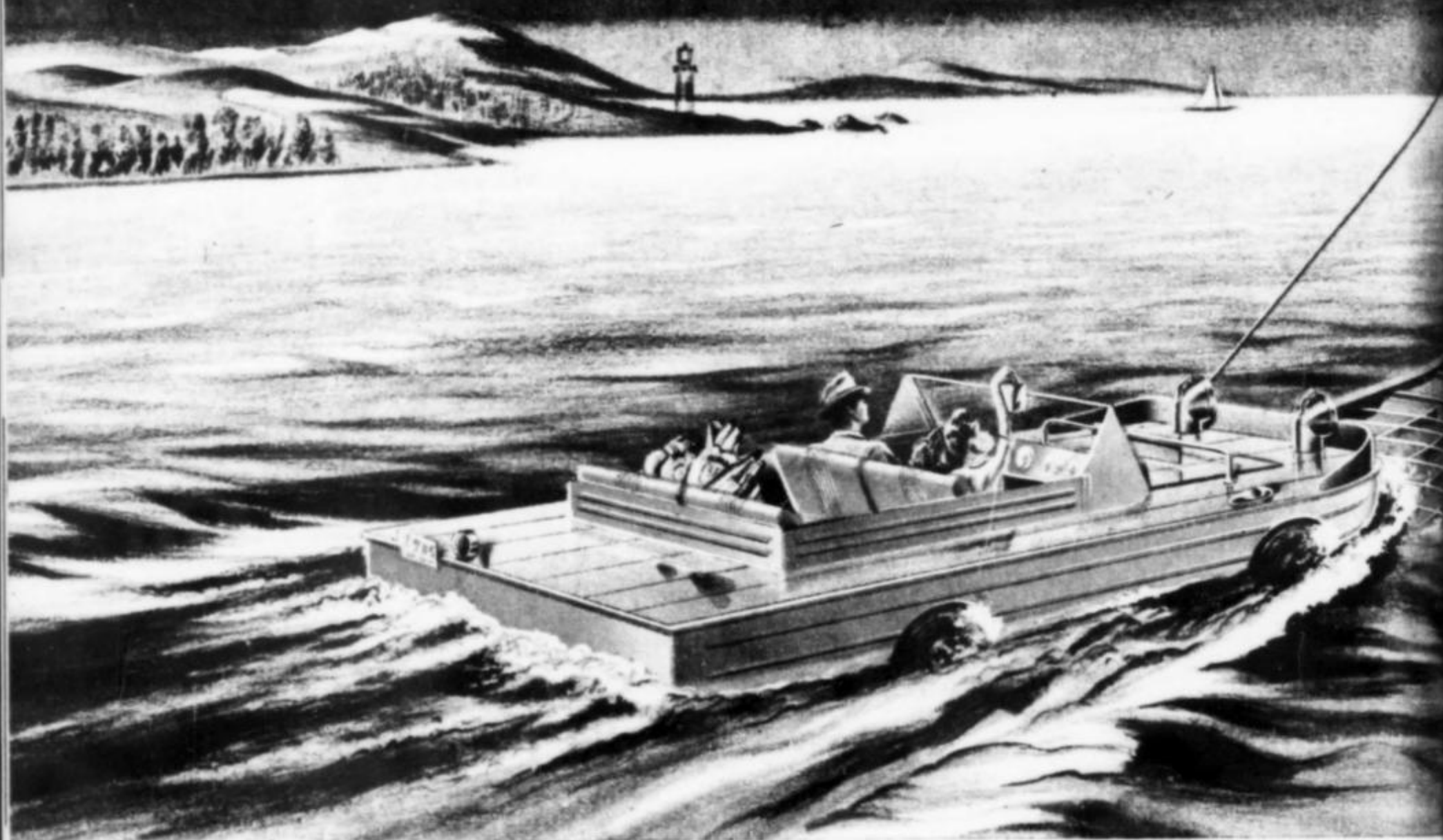
MEMBER AUDIT BUREAU OF CIRCULATIONS

Elsie M.

The Navy's sturdy LCM (Landing Craft Mechanized) makes a handsome postwar houseboat.

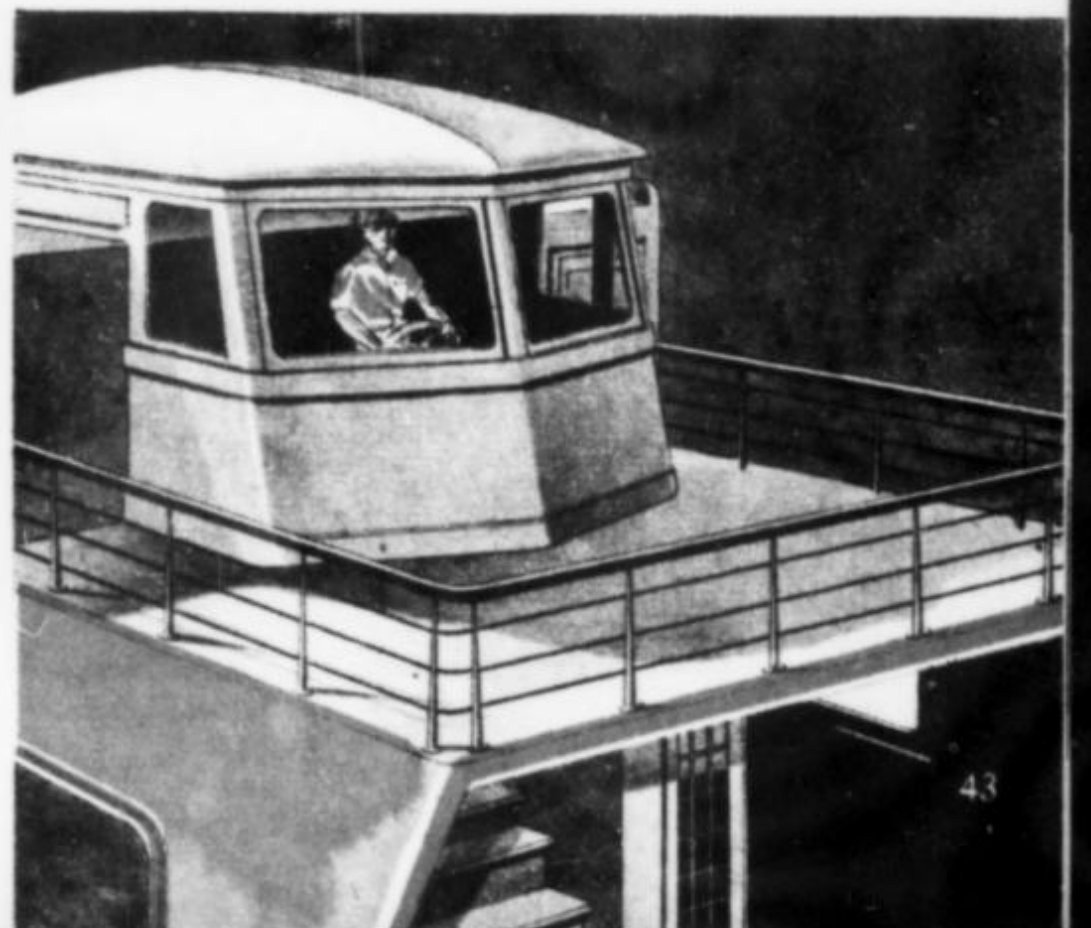
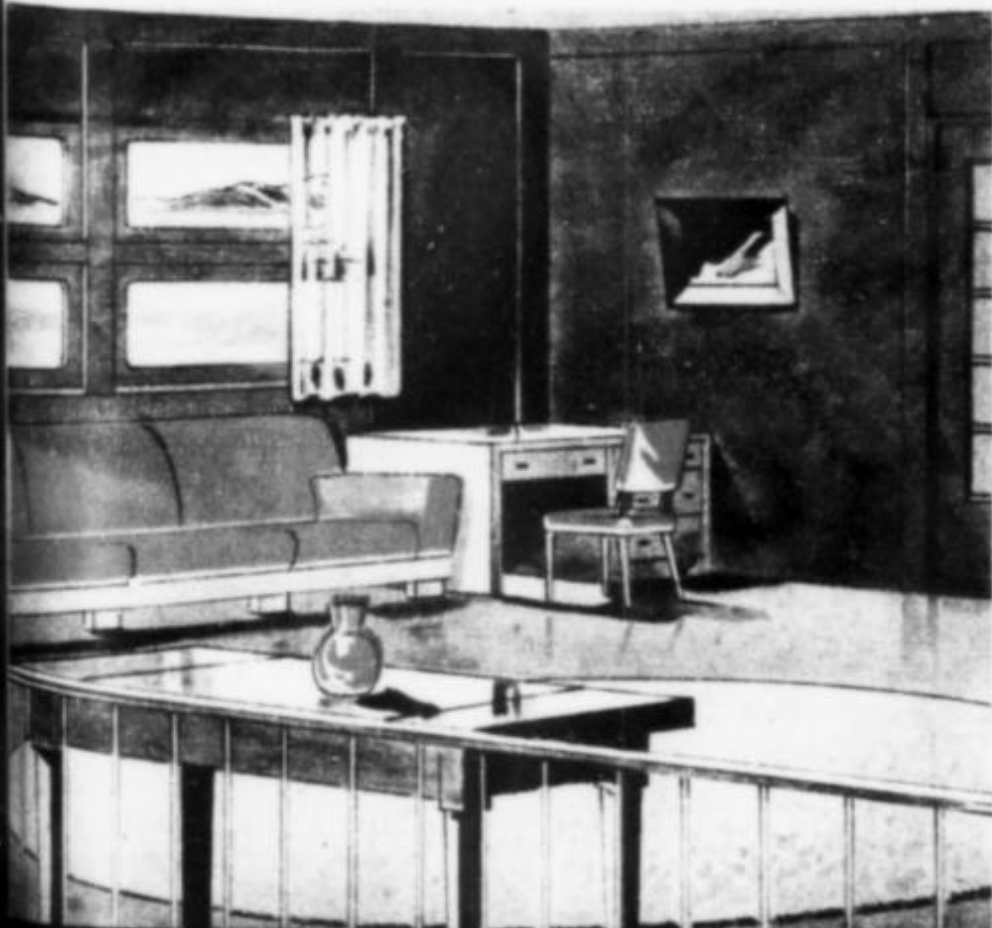
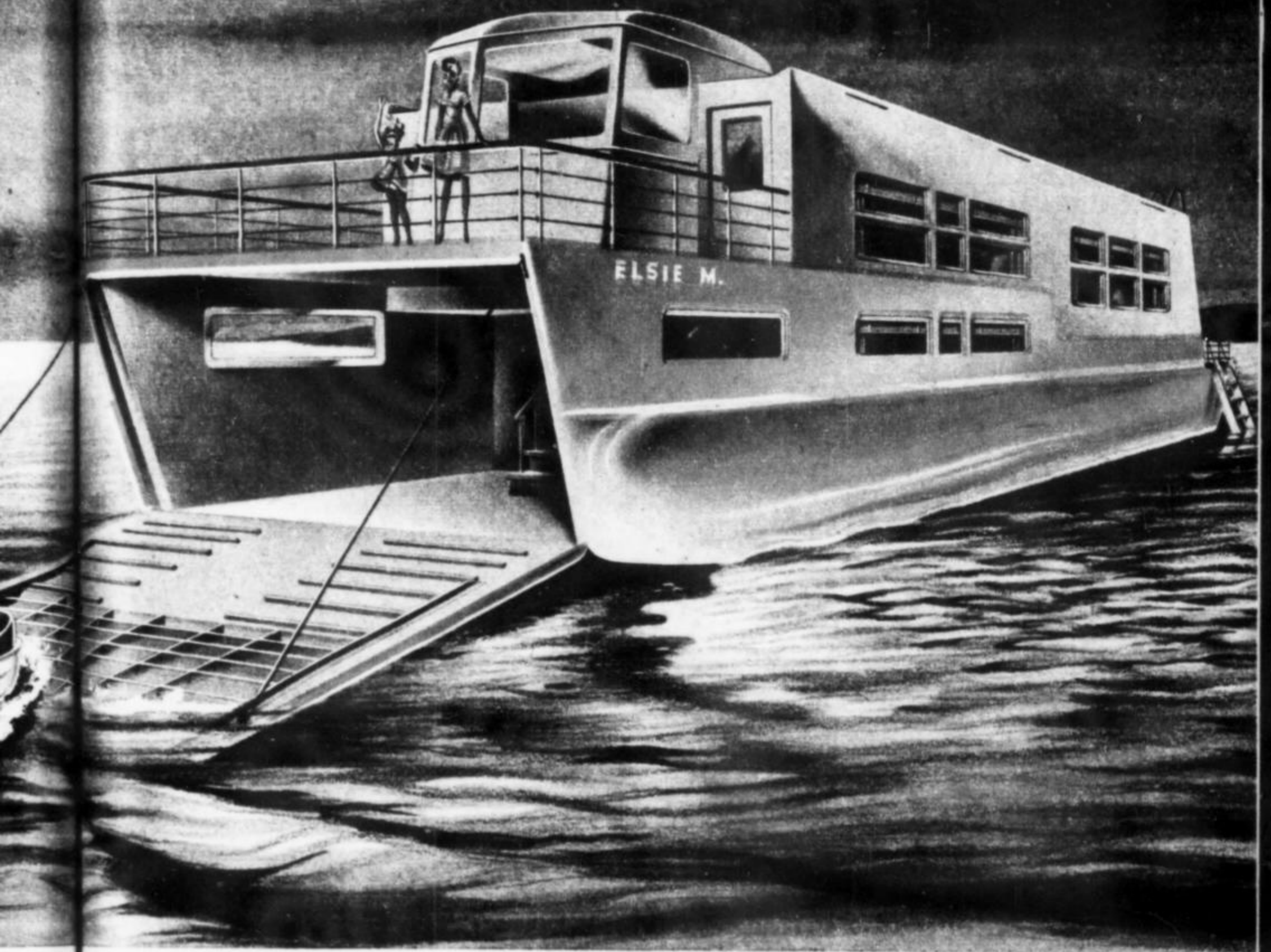
OF ALL the Navy equipment adaptable to civilian use, none offers wider possibilities than the 56-foot LCM (Landing Craft Mechanized).

These chunky denizens of the deep, resembling a cross between a coal barge and a PT boat, are powered by twin diesels and constructed entirely of steel. As all yachtsmen and small commercial operators know, this represents the ultimate in ship building and only [Continued on page 44]



BY TOM McCAHILL

*Designs and illustrations by
Wheelock and Benson*



the extremely high additional expense has kept it from replacing the conventional wood hull and gasoline engine. The twin screws, individually turned by two 225-horsepower Diesels, immediately place the LCMs in the luxury class, though they will probably sell for just a fraction of their real worth when Uncle Sam swings the hammer. This may mean that the man who has dreamed for years of owning a home on the water is closer to it than he thinks. It may mean an initial opportunity to the returning veteran, looking for a business to enter, as the commercial possibilities of an LCM are almost limitless.

The Marines in the Pacific soon learned the versatility of these fine boats and several were decked over and used as combination beach patrol boats and living quarters. One particularly well converted job boasted twelve bunks and carried a full sized field kitchen and a jeep forward, the jeep easily launched by beaching bow on and lowering the ramp.

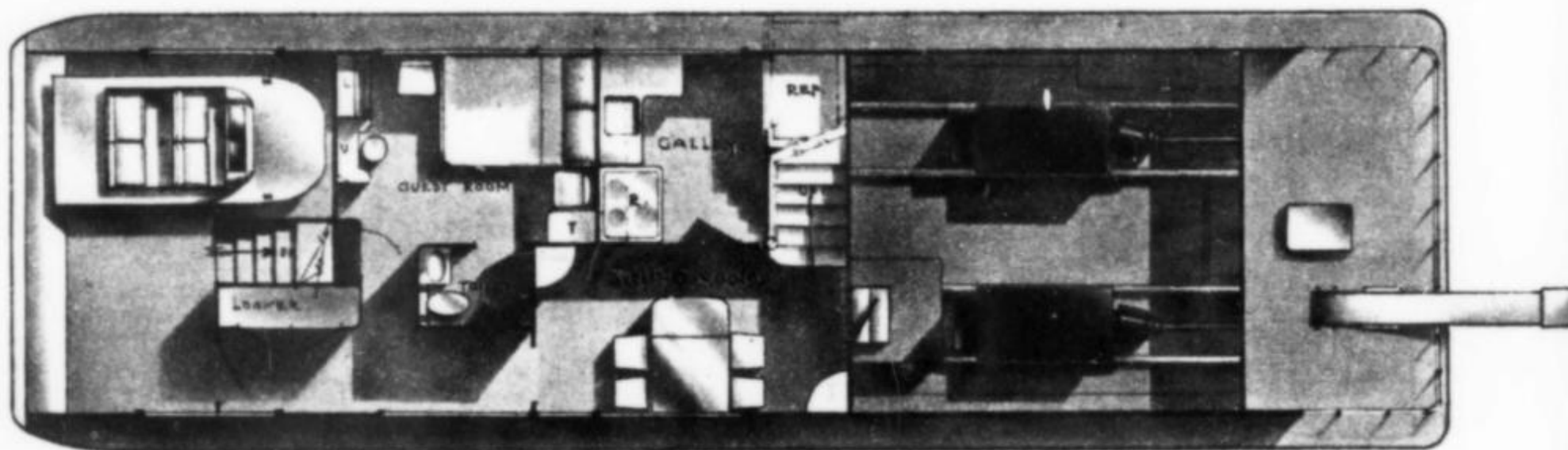
Incidentally, to get back to John Civilian—who ever heard of the finest prewar yacht sporting a garage? Well, on an LCM the collapsible driveway is there and all that is needed is a roof. Another feature of im-

portance is the simplicity of hull upkeep. The bottom construction and shallow draft allows for easy beaching without damage; after all, they were built to be beached and will usually pull off by just reversing the engines. If operated in tidal waters, it is simple to beach at high tide and make repairs or paint as the water recedes and before the next incoming tide, as they only draw 2 feet 9 inches normally or 3 feet 6 inches loaded to capacity. Repairs such as damaged plates or leaks can be remedied by phoning the local blacksmith or garage man to come down to the beach with welding equipment.

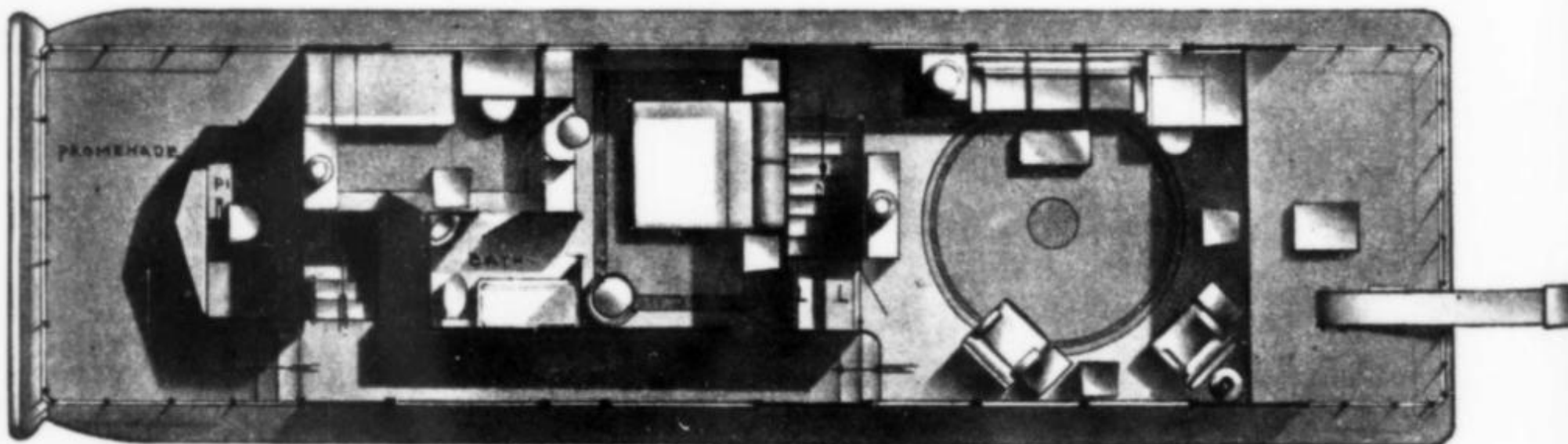
By now, you may be wondering just what the fuel cost of operating one of these boats might be. From reports in the Pacific, they consume approximately one gallon of oil per mile, running both engines at cruising speeds, which is extremely economical for a boat of this size.

The bitterest pill for the prospective yachtsman or houseboat owner to swallow in an LCM is her looks. The stern view is conventional enough, but the bow lines present an aesthetic problem of a serious nature. Doubtless, there will be hundreds of designs for glamorizing these sturdy boats, but they

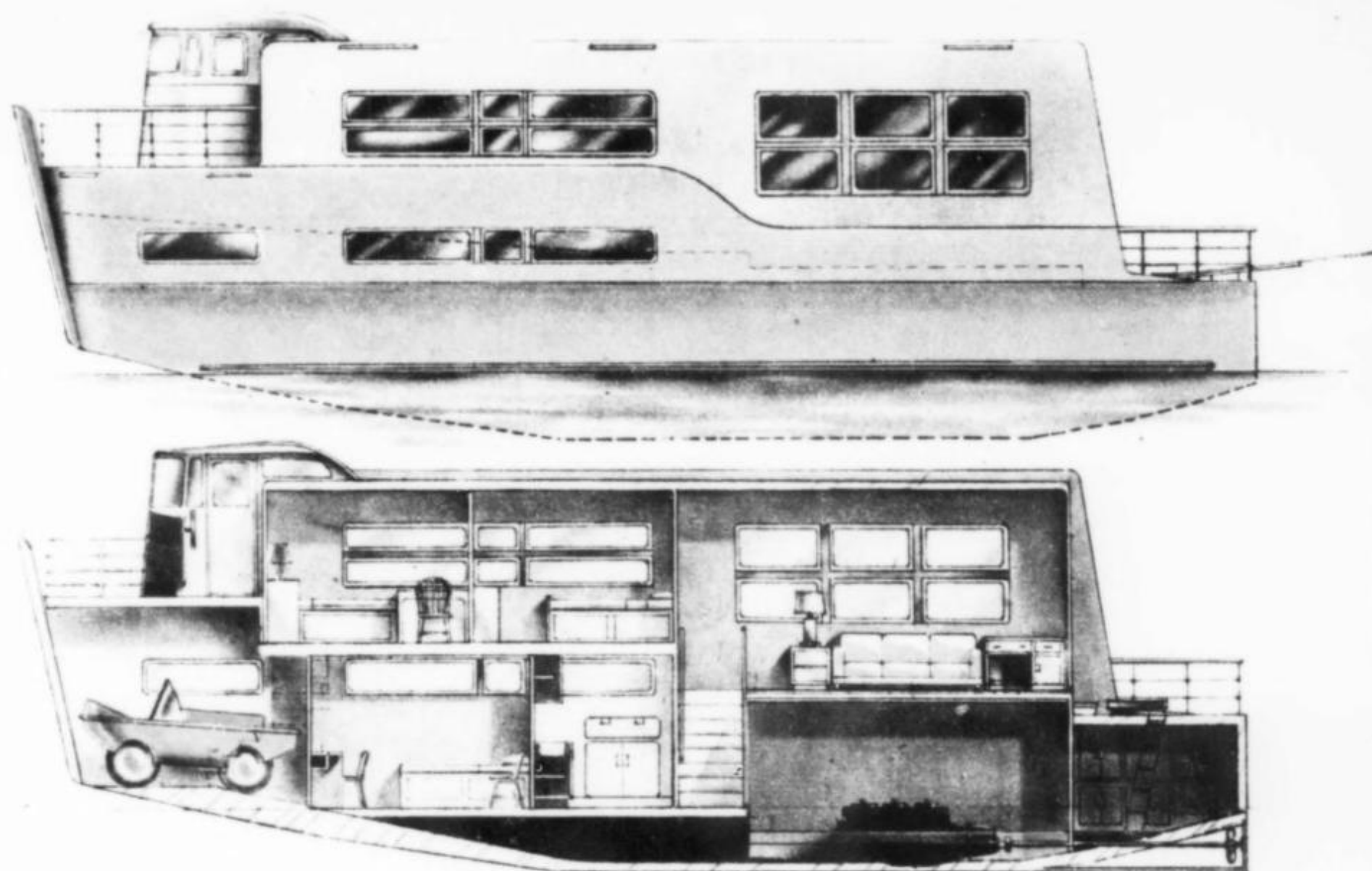
Upper and lower deck plans of the Elsie M. converted from an LCM. Lower deck contains dining room, galley, guest room and garage for amphibious jeep. Upper deck carries dining room, promenade, bath and bedrooms.



LOWER DECK.



UPPER DECK.



Side view shows vertical arrangement of rooms and position of garage and engine room. Well, forward of engine room, is 32 feet long and 14 feet in beam. Elsie M. draws only 3 feet 6 inches when fully loaded.

will never match the custom-built cruiser in appearance and by the same token, few cruisers will offer the mechanical and structural advantages of the LCM. It isn't necessary to be a naval architect or even an engineer to plan a series of designs best fitted to your own particular use, as the most difficult work and construction has already been done. The hull, engines and engine room are complete and built to the finest Navy standards; all that remains to be done is to add some sort of living quarters and personal plumbing, then move aboard. There is ample space for a bath, galley and several staterooms below decks and many types of superstructures may be added, including a bridge, dining saloon, sun deck or owner's quarters. If you are interested in a houseboat conversion, you will undoubtedly want more spacious living quarters than a man just seeking a weekend hobby.

In houseboats, looks are of secondary importance, comfort being the keynote, so if your desire is a home on the water, you will probably consider a variety of designs that will include everything from springboards to flower boxes. The open well, forward of the engine room, is approximately 32 feet long (this varies slightly, depending on the original builder) and 14 feet in width or

beam. A flush deck laid across the present top sides would allow for 8 feet head room aft, tapering off to just under 6 feet at the bow.

All LCMs have tremendous built-in side or wing tanks to keep them afloat in the event of swamping or bad leaks, and these can be easily utilized to carry extra fuel or water by tapping and piping. These tanks running from bow to stern are not only an excellent safety factor, but will provide insulation against heat or cold below decks. The engine room is a completely encased steel structure, entered through a steel trap door. There is more than 7 feet headroom inside and ample space for tool storage, lubricants and parts. The flooring of the main well is for the most part ribbed steel, allowing air space for any wood or composition covering to be added. Anyone handy with tools, should be able to partition off staterooms, a galley, bathroom and so on, before laying the main deck. For partitions, plywood or a similar material should prove best and the deck planking will have to be chosen to conform to the amount of superstructure or deck weight to be added. The LCMs will make fine floating homes, and due to their shallow draft should prove as popular on small lakes and rivers as they will on the deeper salt waterways.

FIDO

BY
GILBERT
PAUST

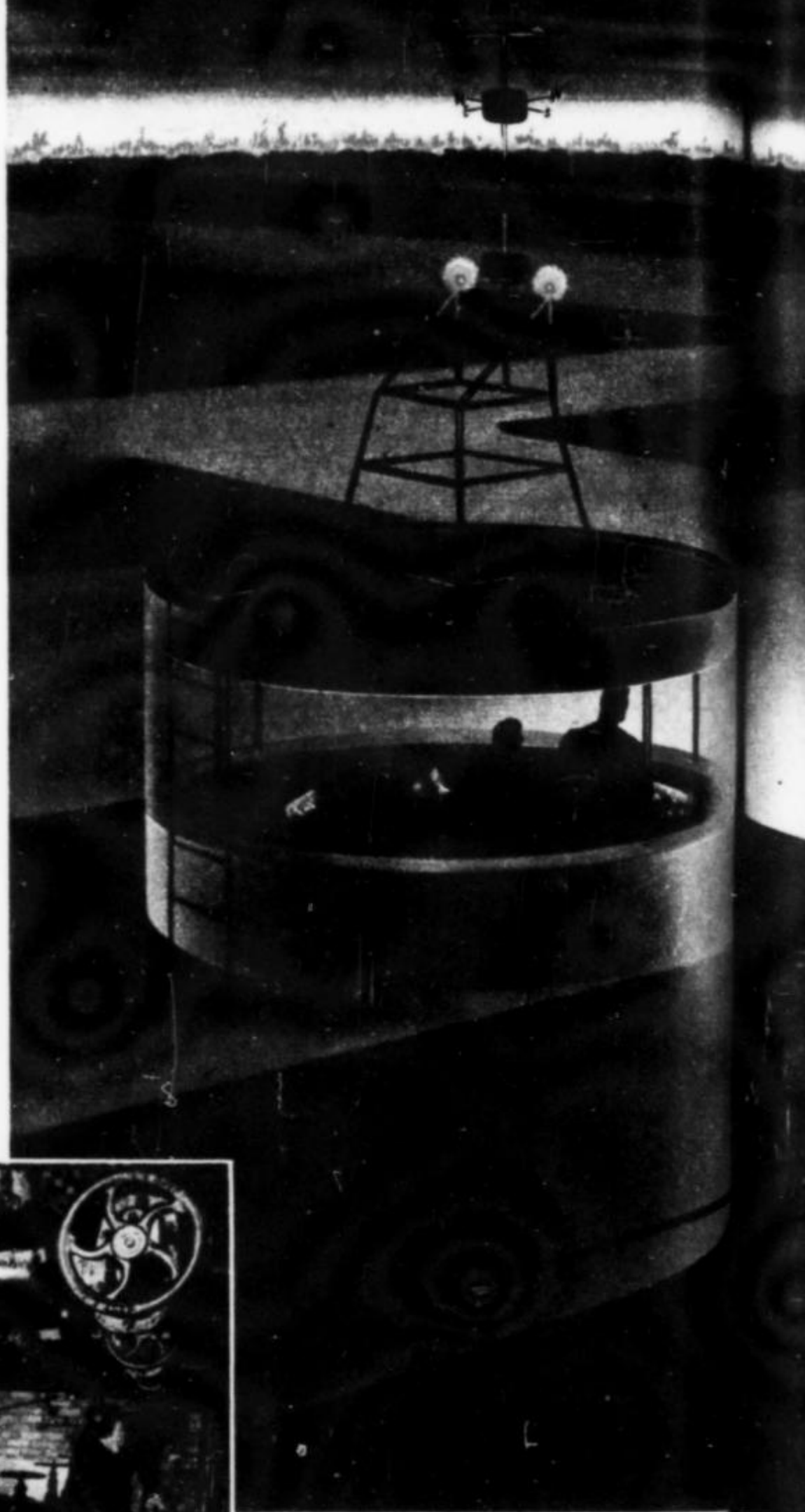
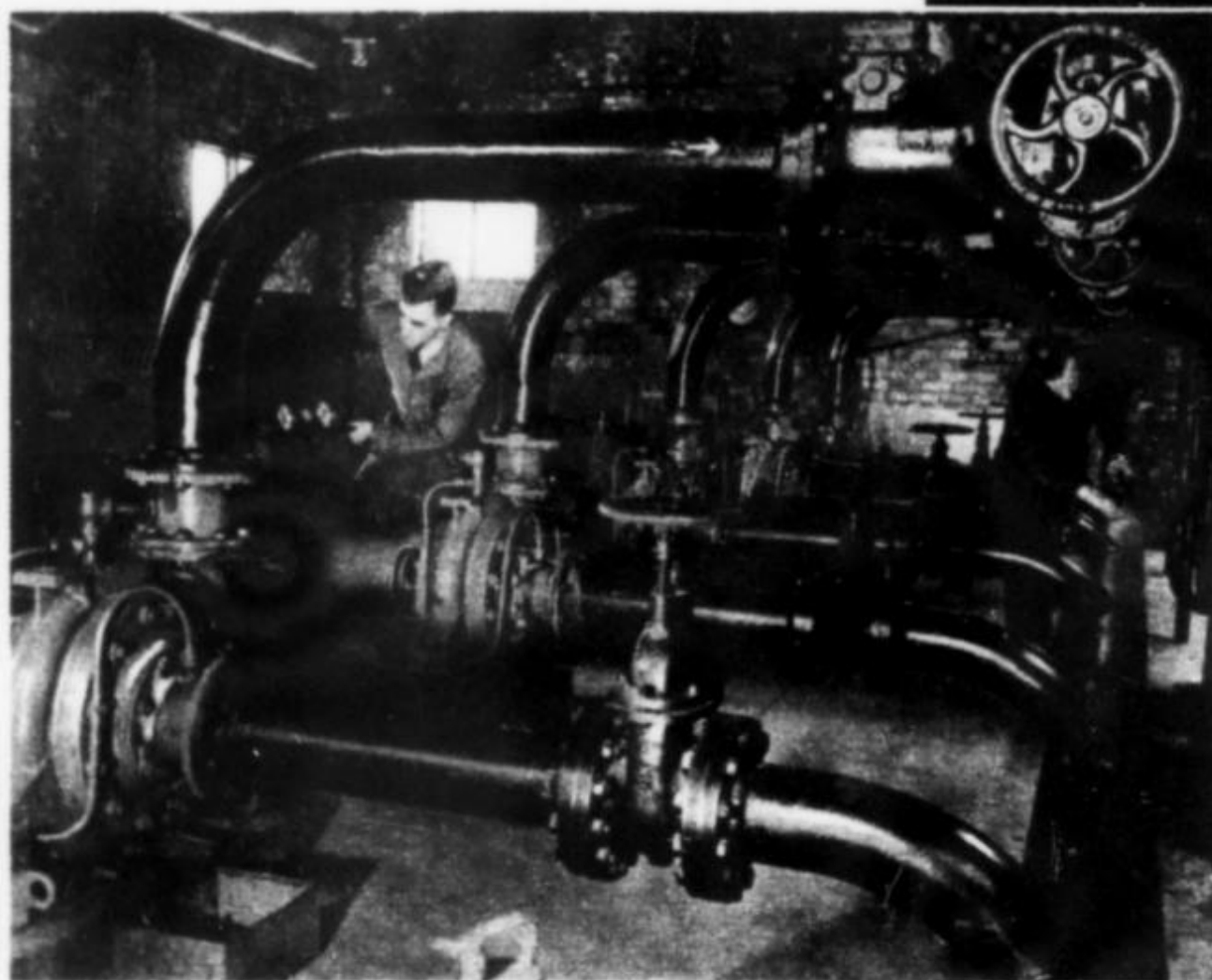
A cryptic word with which the British cleared their fog-bound airfields to enable Allied airmen to land safely.

ON NOVEMBER 19, 1943, four Halifax bombers, back from an excursion over the Ruhr, roared to a landing at their base in England.

Nothing unusual about that, you say? But this case was different! The visibility surrounding the airfield was *less than 300 feet*, and that's snafu weather in any man's language.

How did they do it with the airport completely fogged in? For the answer we have to go back to September, 1942, when Britain's Petroleum Warfare Administrator, Geoffrey Lloyd, received an urgent request from Prime Minister Churchill that he undertake experiments in the dispersal of fog at airports so planes could land safely. It was a race against time for the lives of Allied pilots, for the British fog was even more menacing than the flak over Germany.

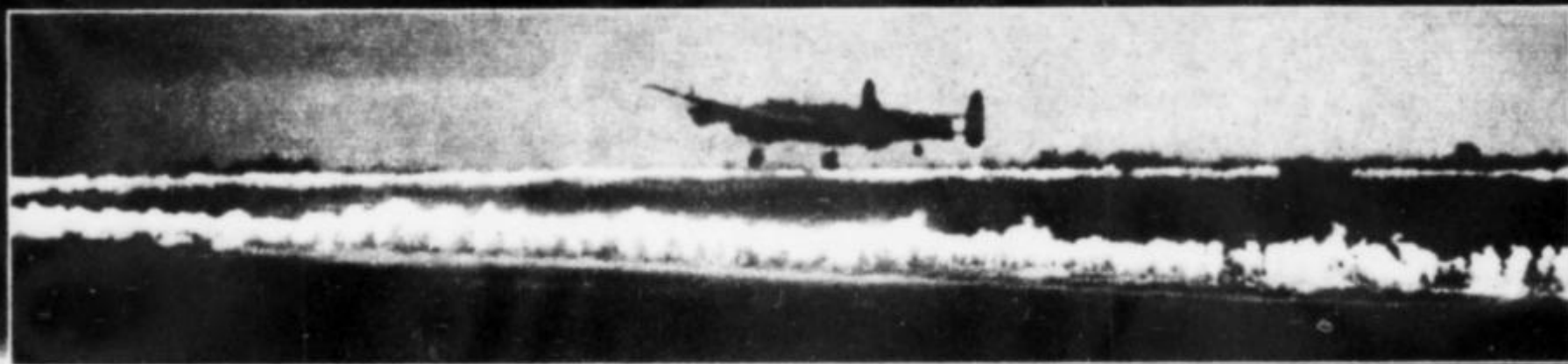
Research and experiment went on simultaneously under the name of Fog Investigation Dispersal Operations. Five hundred of Britain's scientists, engineers and pilots tried



In the drawing above, an MI artist has depicted a scene which might occur at a Fido-equipped postwar airport. Plane image in photo inset is distorted by burners' heat.

Gasoline-driven centrifugal pumps supply petroleum to Fido burners along runways.

Mechanix Illustrated

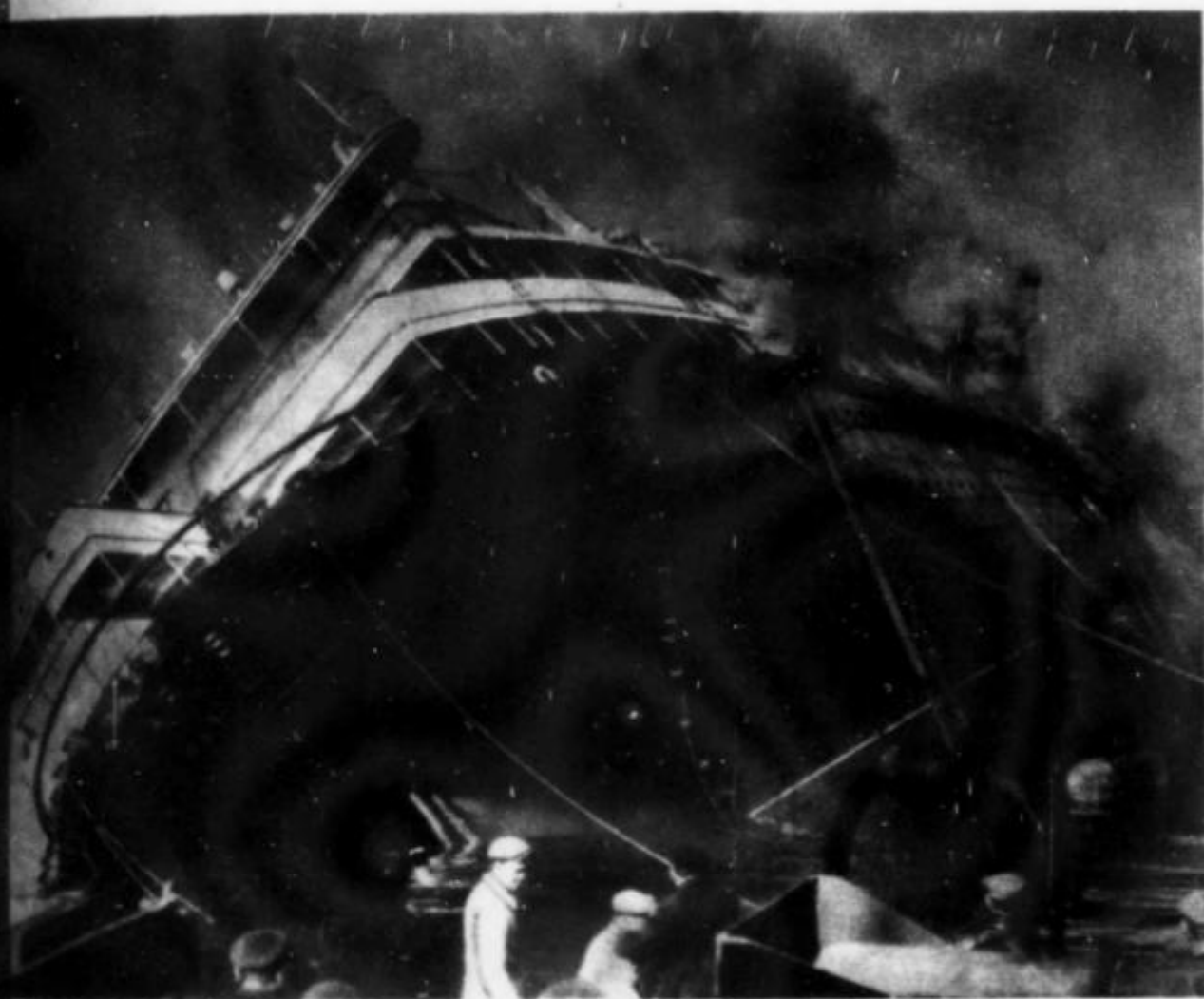


supersonic waves, electrical discharges—even outdoor refrigeration and air conditioning. They finally decided that heat offered the best method of solution, and coke and petroleum, burned in large heat-producing installation, were tried at the various airports. It was discovered that if the heat of the atmosphere could be raised 7° F., the fog disappeared. Coke was discarded in favor

of petroleum. The final installation decided upon consisted of petroleum burners connected by pipes and situated parallel to, and some distance from, each side of the main runway. Where intersecting runways crossed, the burner pipes were sunk flush with the ground to avoid obstructing the aircraft. When lighted, the heat from these burners could clear the fog [Continued on page 158]

October, 1945

Fireboats To The Rescue!



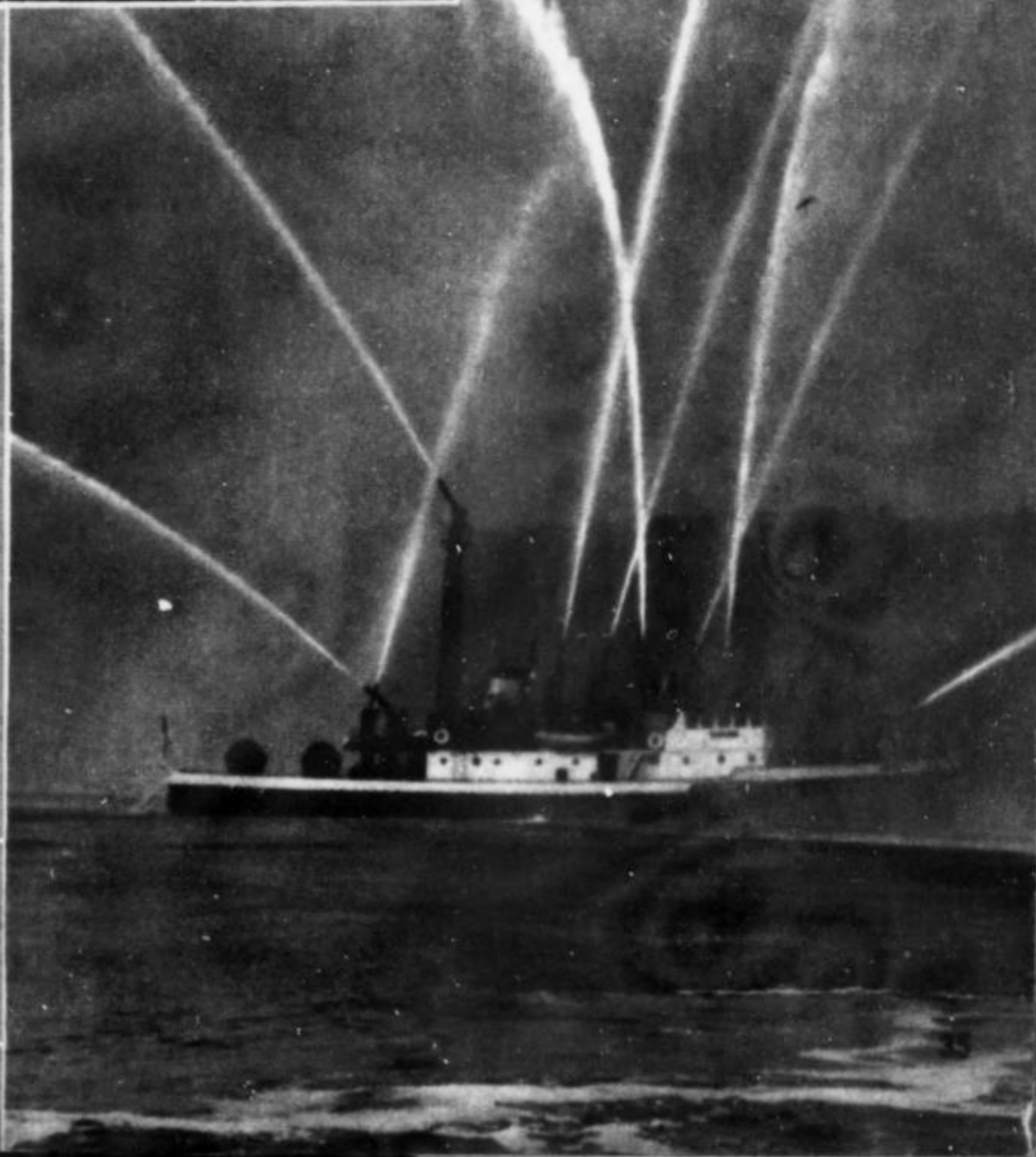
A dramatic picture of the great French liner *Paris*, taken as the burning ship heeled over on her side. Right: the New York fireboat *Fire Fighter* testing its equipment. Note water washing down hull.

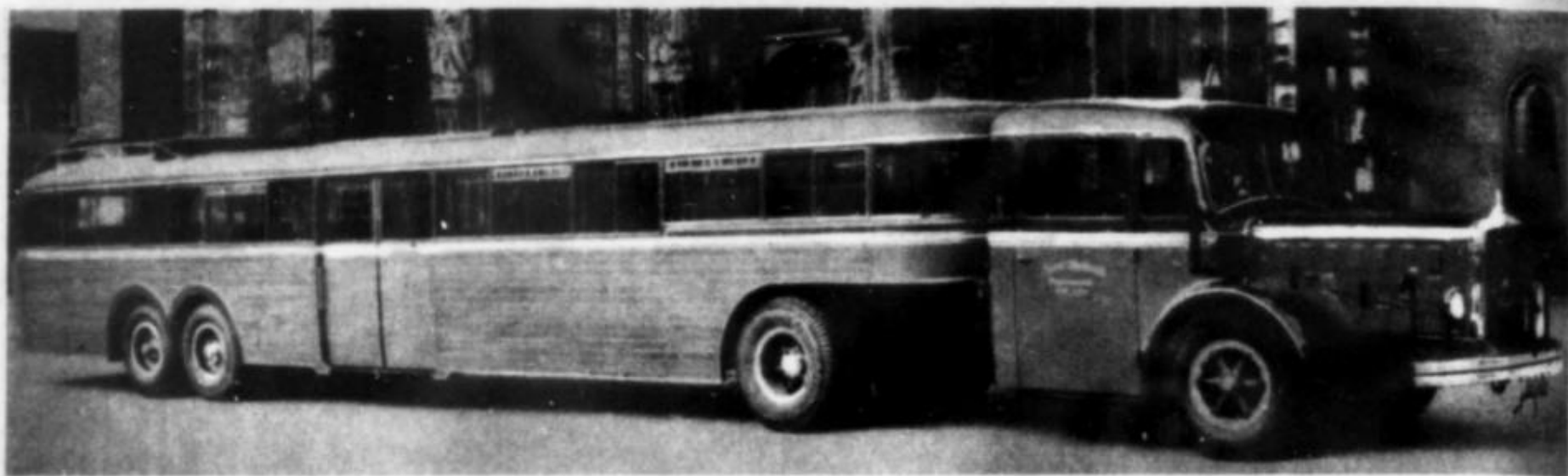
IT IS nearly midnight. The black, oily waters of France's great port, Le Havre, reflect like dancing fireworks the streams of light from great arc-lamps. Smaller lights on the deck of the great liner *Paris* surround her dark, gaping cargo hatches.

Etched against the sky is the gaunt steel skeleton of a giant crane, methodically loading crates into the hold of the French ship, tenth largest in the world. Now and then a boss stevedore blows a whistle to direct the stowing of the valuable cargo—\$500,000 worth of art treasures destined for the World's Fair in New York. The 35,000 ton

"She rolls!" With that cry a New York City fireboat weighs anchor and gets under way, ready to battle fire and water, the toughest combination a big city fire department can face!

by
John R. Whiting





120-Passenger Bus Built In Germany

THE huge eight-wheeled motor-bus shown above, which rivals a railroad coach in size, was constructed at Ulm, Germany. It will carry 120 passengers comfortably and is said to be the largest in the world.



Big Bass Drum Has Six-Foot Diameter

THE biggest bass drum to make its appearance in England in 155 years was completed a short while ago in a London factory. Construction of the drum, which is six feet in diameter, took longer than expected because the manufacturing firm required almost a year to find two cowhides big enough for the purpose. The drum was designed to produce thunder effects in an operatic production.

Telescope Support Designed For Auto

FOR the tourist or sports enthusiast who wishes a magnified view of distant scenes, a convenient support has been designed for mounting a telescope on an automobile window. The new support is made of aluminum and slips snugly over the lowered window of any closed car. Adjustable at will, it enables an observer to see in comfort what the landscape offers.



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OUTER SHELL OF
LIGHT ALLOY

Snow Cruiser for A

INNER BLANKET
OF HEAT INSULATING
MATERIAL

ENGINES

RAISED
CONTROL
CABIN

FUEL OIL AND
OTHER SUPPLIES

BATTERIES

GALLEY

DOOR

RADIO TABLE

STEERING POSITION

HEATER

NAVIGATOR'S
TABLE

AIRPLANE
CARRIED
ON TOP

PLAN OF CONTROL CABIN

METEOROLOGICAL
EQUIPMENT

58
STAIRWAY TO
SLEEPING QUARTERS AND
LOWER DECK

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Antarctic Explorers

A MODEL of the 45,000-pound ice cruiser which will be used in the forthcoming U. S. Antarctic Expedition was demonstrated by its designer, Dr. Thomas C. Poulter, scientific director of the research foundation of Armour Institute of Technology. Dr. Poulter considers the cruiser, which is being built at a cost of \$150,000 to be the most practical and efficient means of polar exploration yet tried.

Measuring 55 feet in length and 15 feet in height, the cruiser will carry four scientists in its cabin and a five-passenger airplane on its back. It will be equipped with four large rubber tires, each ten feet in diameter and weighing 1,500 pounds, and will resemble a cross between an overland bus and a tank.

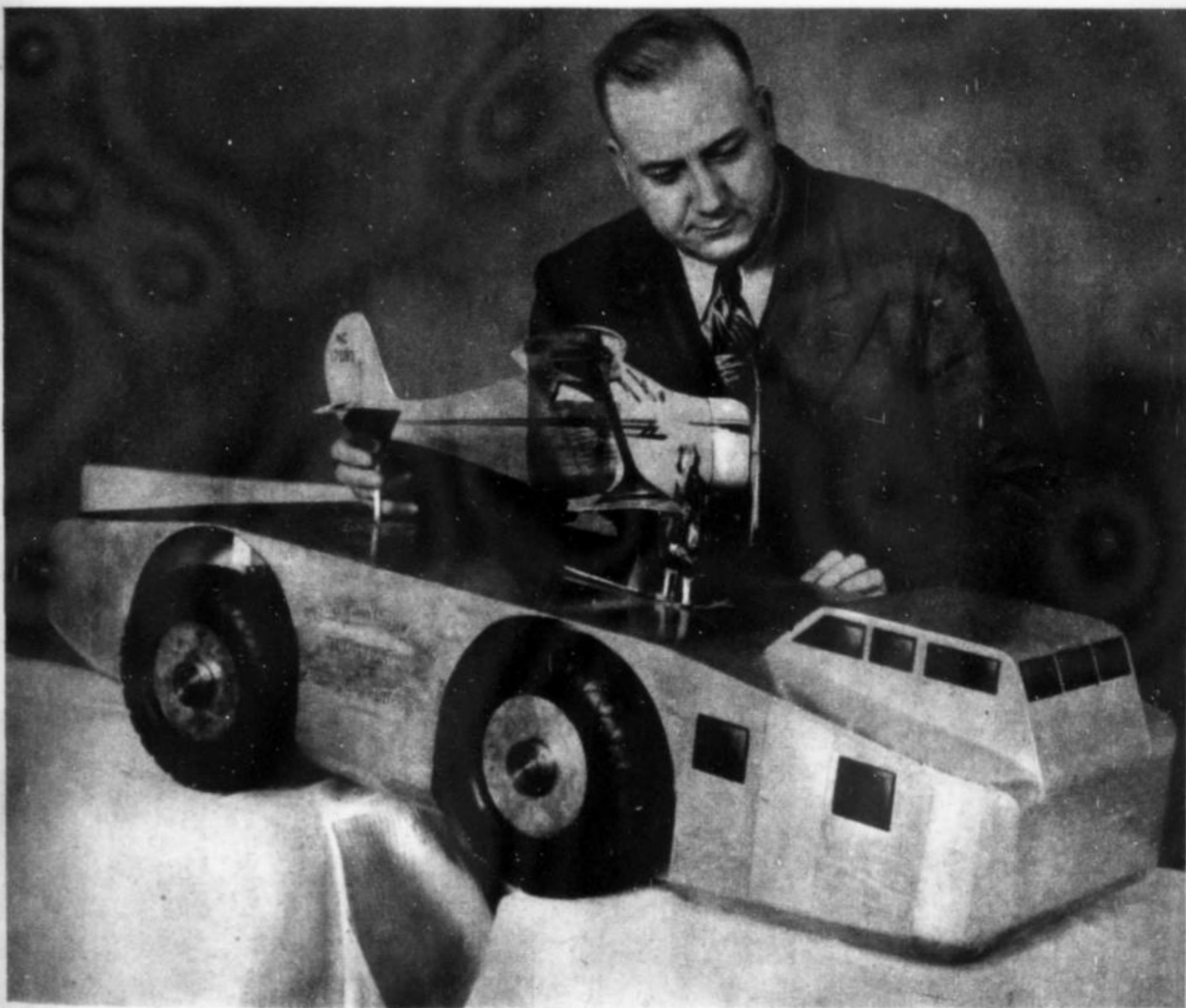
The ice cruiser will be able to span crevasses

15 feet wide, turn corners almost within its own length and climb at an unusually steep angle. It will be possible to raise or lower its cabin. The plane on top can be ready for flight in ten minutes.

The full weight of the craft, including supplies, equipment and personnel, will be 75,000 pounds. This huge ice transport will have a cruising range of 5,000 miles and a speed of from ten to 30 miles an hour. Its wheels are retractable and, when crossing a crevasse, the front and rear ends will glide in turn on their bellies until level ground is reached. Two electric Diesel engines, the combined horsepower of which will be 240, will furnish the motive power.

[Continued on page 124]

Below: Dr. Thomas C. Poulter, designer of the snow cruiser, demonstrates with a model how the cruiser will span an ice crevasse in the Antarctic.



MECHANIX ILLUSTRATED

JUNE

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IS OUR NAVY ATOM-BOMBPROOF?
In *Full Color*—PLASTIC EYES FOR THE BLIND

MECHANIX ILLUSTRATED

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JUNE, 1946

VOL. XXXVI No. 2

On the cover: Cross section of an aeronautical compass

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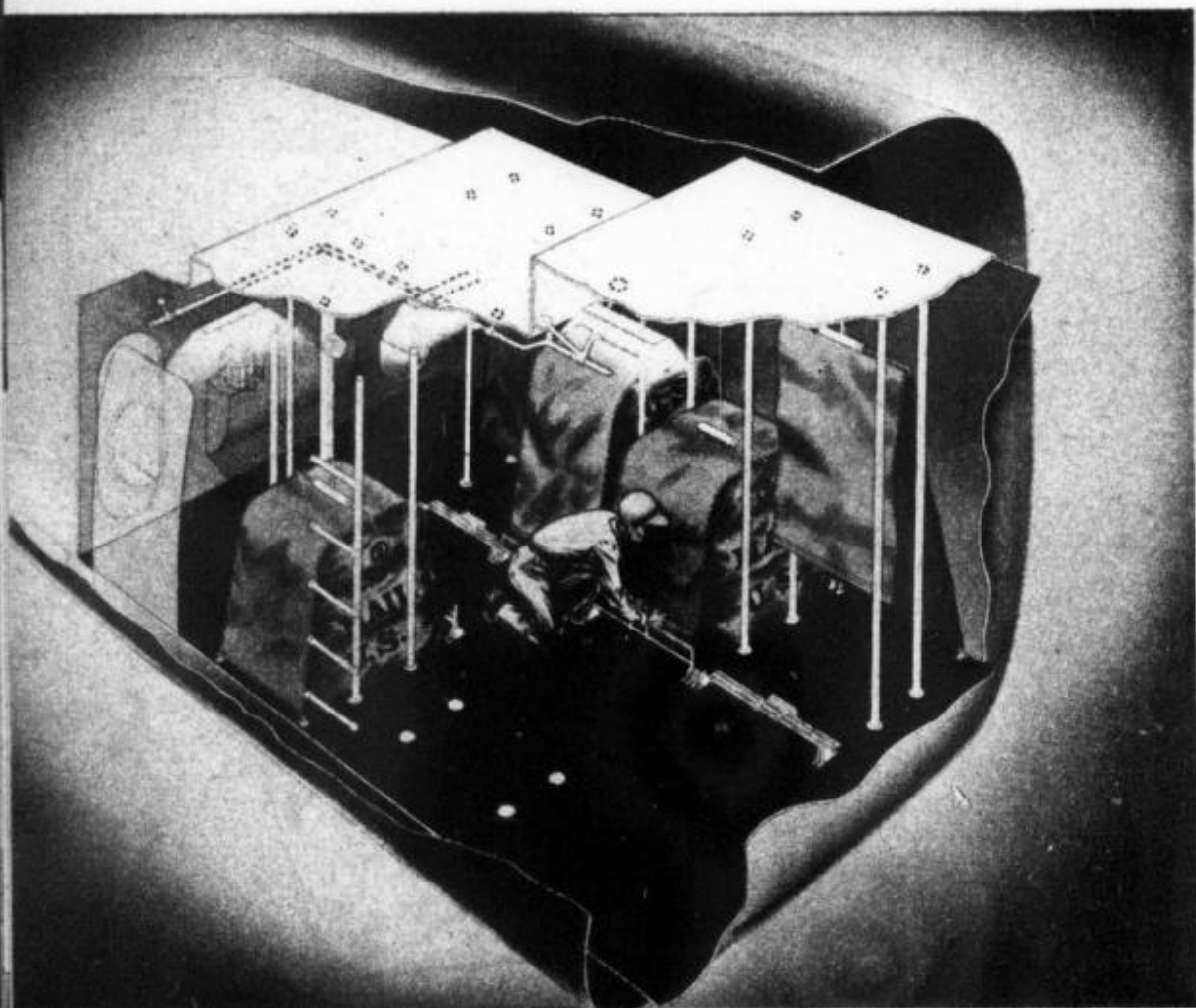
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FLYING POST OFFICE



Mail bags addressed to cities en route would be stowed in forward compartment with anchoring devices to keep mail from shifting in hold.

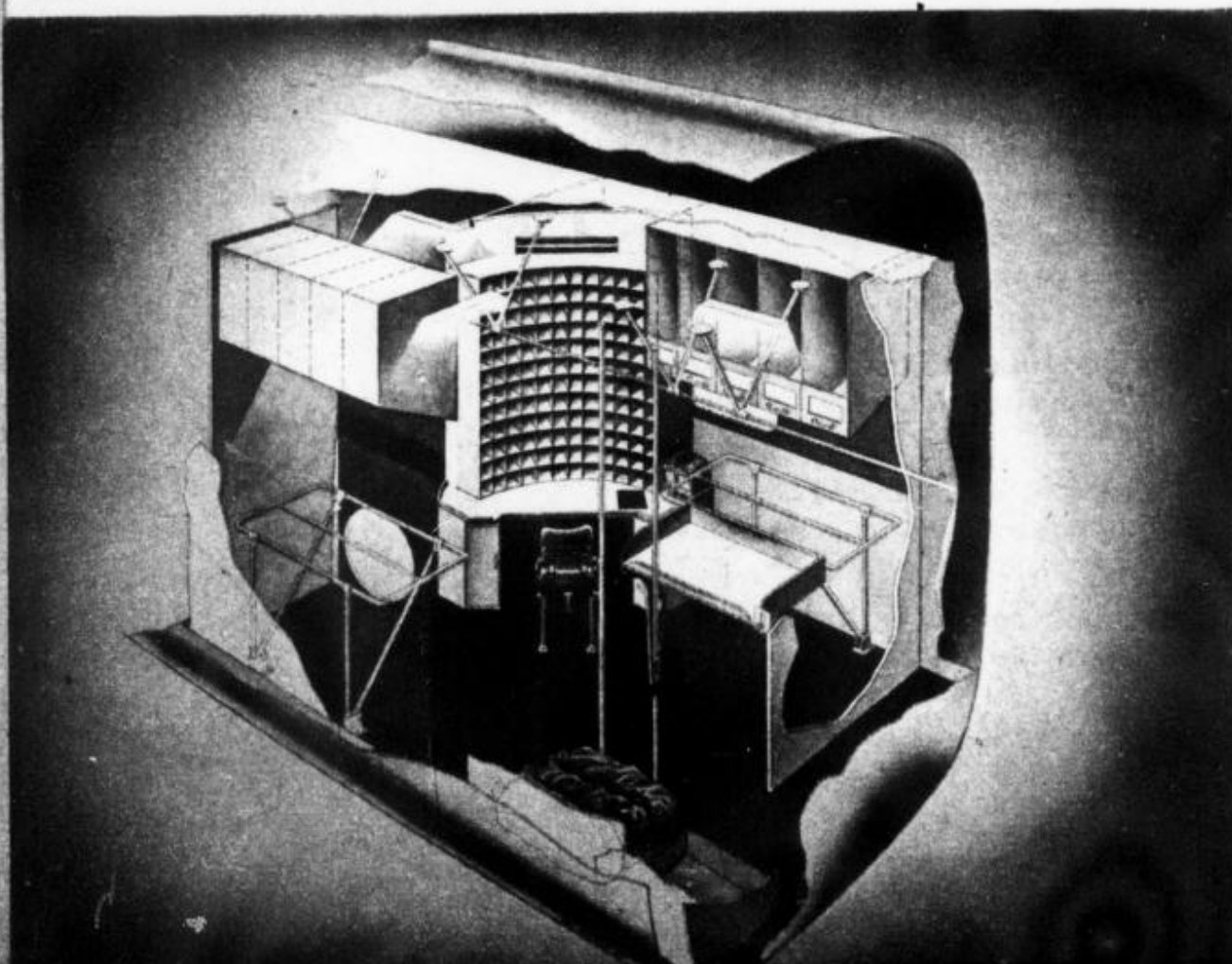
The "working section" of the plane will have specially designed lightweight equipment for sorting airmail while the plane is in flight.

70

A 200 mph. "flying post-office" using the Fairchild Packet cargo plane, is in the offing, according to a recent announcement by Post Office Department and Air Transport Association officials.

The plane will be equipped with unique facilities for storing and sorting mail in flight which, coupled with the plane's great capacity, long range and ease of loading will give far faster airmail service between major American cities than is now possible.

The plane is capable of carrying up to seven tons of airmail in its squared fuselage.





B-17 "drones," operating by remote control from "mother" planes, will photo the test.

Crossroads at Bikini

The fate of our navy hangs on the outcome of the most dangerous and dramatic maneuver ever known!

BY JAMES NEVIN MILLER

OUT in the lonely atoll of Bikini, 4,150 miles southwest of San Francisco, the curtain of the first act of one of history's greatest dramas, Operation Crossroads, is about to rise. A production staff of 20,000 scientists and technologists has assembled the supporting cast and props. The dress rehearsal has been held, and the vast stage is set.

For the stellar role, an A-bomb of the

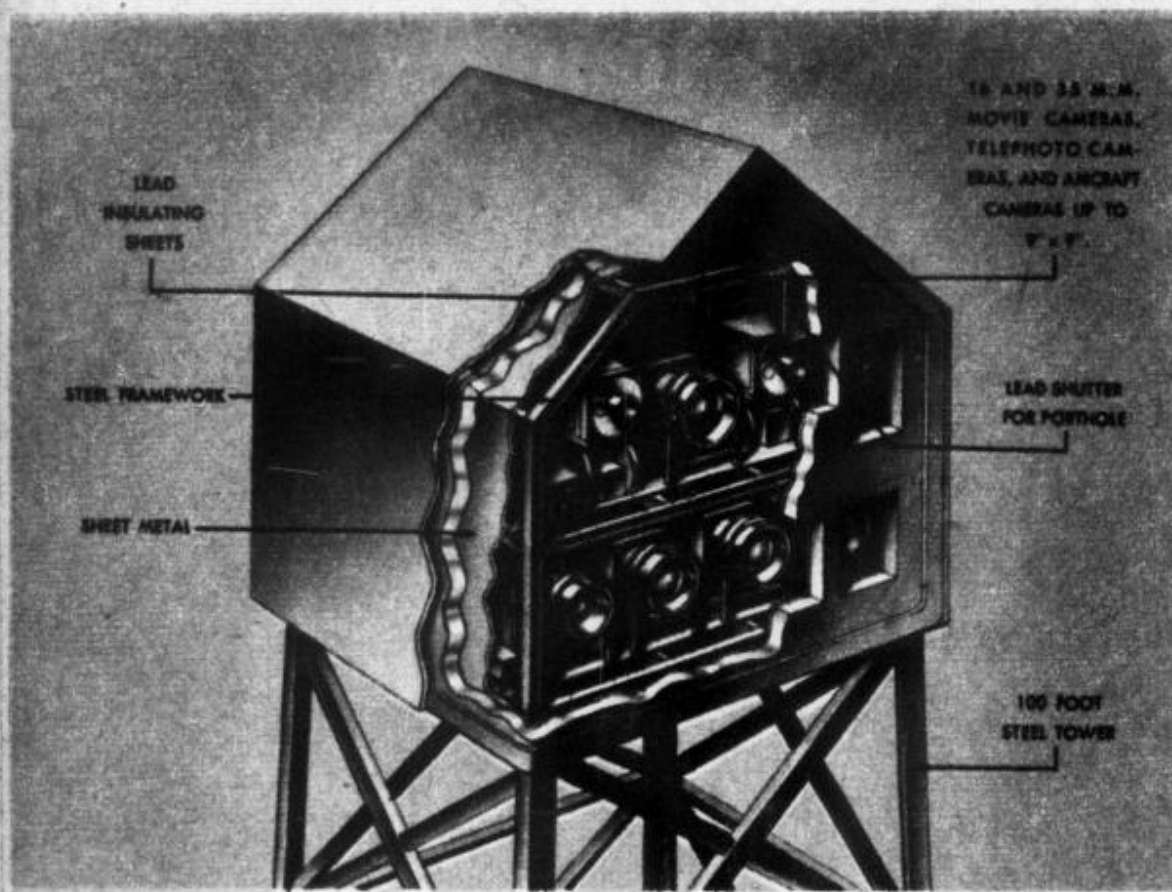
power used on Nagasaki will be dropped from a B-29 on about 100 surplus and obsolete ships.

Great decisions hang on the events of this day. Sturdy target ships of almost every major type will undergo the effect of man's most terrible weapon in a test to decide the future of the world's naval tactics and ship design.

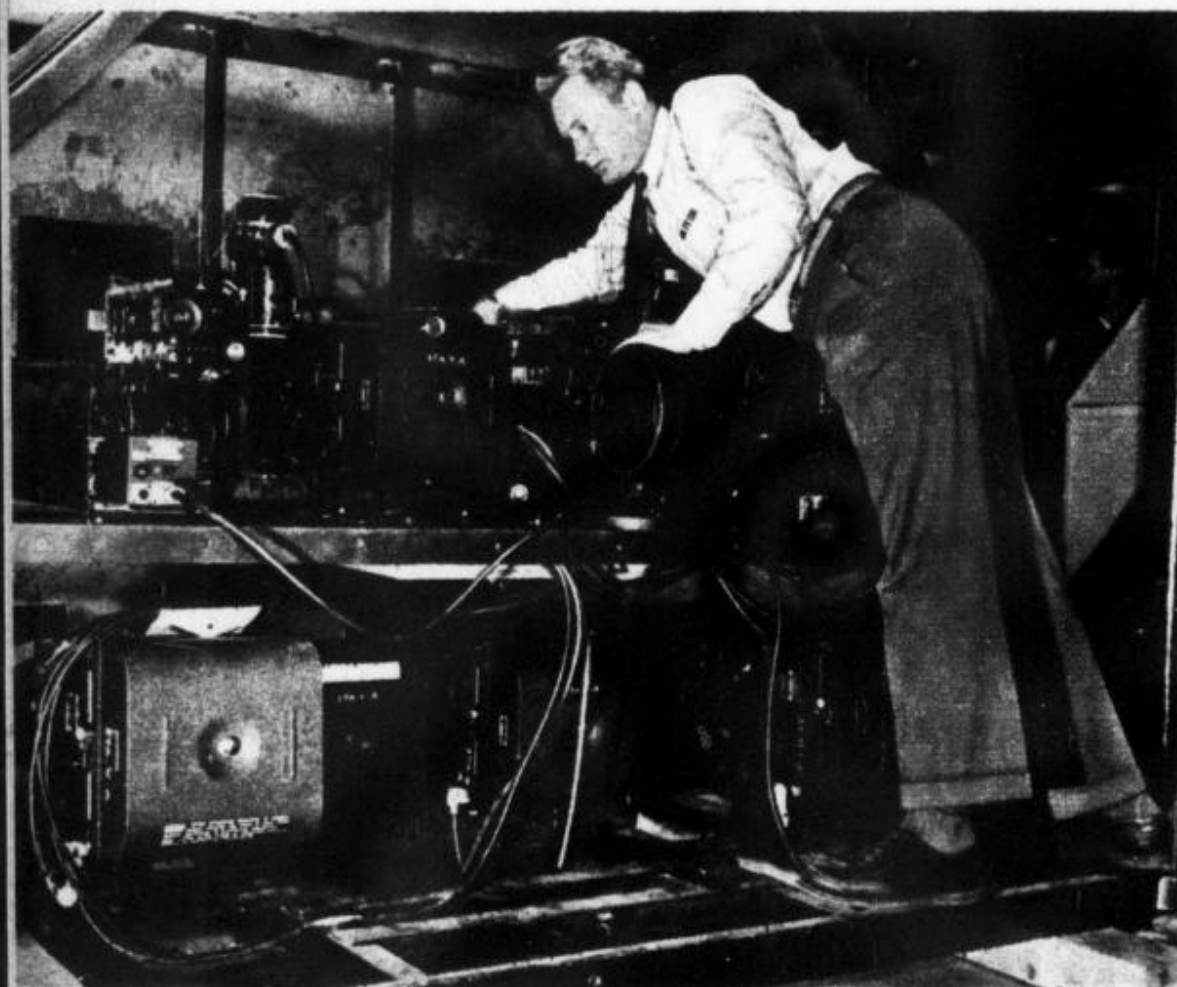
Many Americans will get a closeup



Doomed is the old and valiant U.S.S. Pennsylvania, former fleet flagship.



A drawing of one of the steel and lead towers that will house nests of radio-controlled cameras to photograph the test. Below, rear view of a tower's camera battery.



view of the exploding bomb, for remote-controlled television apparatus operating within a range of 11 miles has been set up there. Automatic movie cameras are set to record the entire show from "ghost" planes and well protected shore positions.

Our military and naval leaders already know what happens when the A-bomb is detonated above dry land. Their concern now is with its destructive potential when exploded above and on and under water. For this it is necessary to have three tests.

It is the first test, the explosion of a bomb "several hundred feet" in the air above the target, that is tentatively scheduled for July or August. A B-29 will release the bomb from 30,000 feet. The second test is set for a few months later. For the first two tests shallow water is needed, so the debris can be salvaged for study. For the final and most difficult test, scheduled for next year, deep water will be needed, so as to minimize the effect of the ocean's bottom on the results. Vice Admiral W. H. P. Blandy, who is in charge of the tests, says it will require depths of "several thousand feet of water."

The "doomed fleet" of 100 target vessels includes 4 battle-ships, 2 aircraft carriers, 2 cruisers, 16 destroyers, 8 submarines, 23 APA's, 2 AK's, 6 LST's, 6 LCI's, and 25 LCT's. In order to test foreign ship construction there are also a Jap battleship, a Jap light cruiser, and a German heavy cruiser, the Prinz Eugen.

The submarines will take the blast under the water, lashed to 30-ton concrete blocks on the bottom of the lagoon.

Two of the helicopters which will procure water samples after bombing.

Mechanix Illustrated



Map showing the location of the remote atoll of Bikini, where history will be made by a bombing.

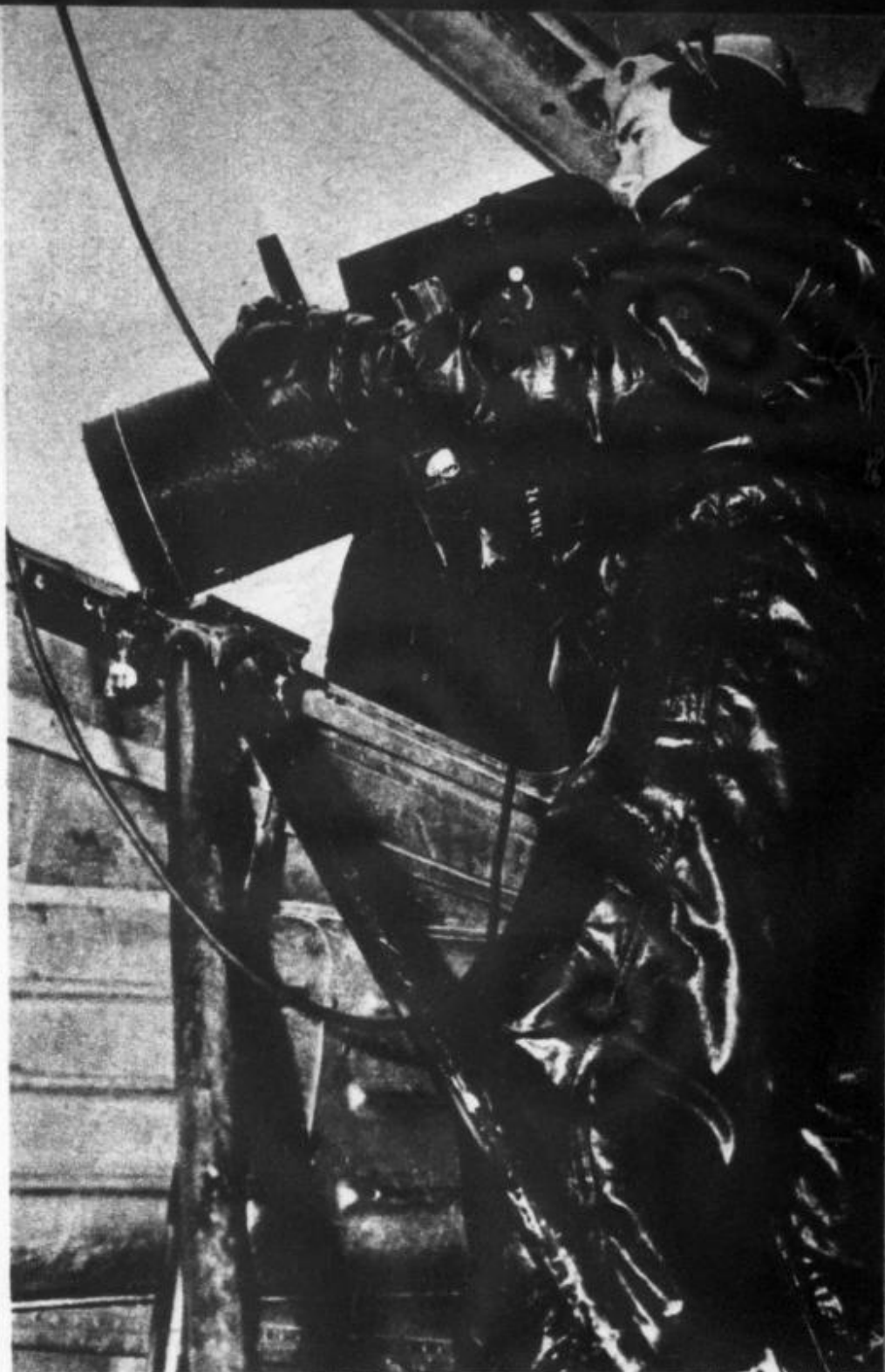
Some 60 ships, grouped 15 to 20 miles away from the explosion center, comprise the support group of vessels. Included are Admiral Blandy's flagship, the Mount McKinley. Patrol duty is handled by 9 vessels. Repair and service unit assignments have been given 25 other ships. Twenty regular salvage units and 2 salvage lifting vessels are included. There are 10 dispatch and boat pool units, 12 transport vessels, two medical units and one survey ship. Helicopters too are on hand to maintain communication between vessels and planes.

The remote atoll of Bikini was chosen as the ideal test theater because it has less than 200 inhabitants, easily evacuated, and because the area is so isolated as not to endanger the lives of persons living nearby. Bikini is the northernmost of the Ralik chain of the Marshall Islands. The atoll is about 21 miles long by 10 wide, and forms a nearly perfect oval of barely submerged coral dotted with some 20 islands rising a few feet above the ocean at varying intervals along the atoll's rim.

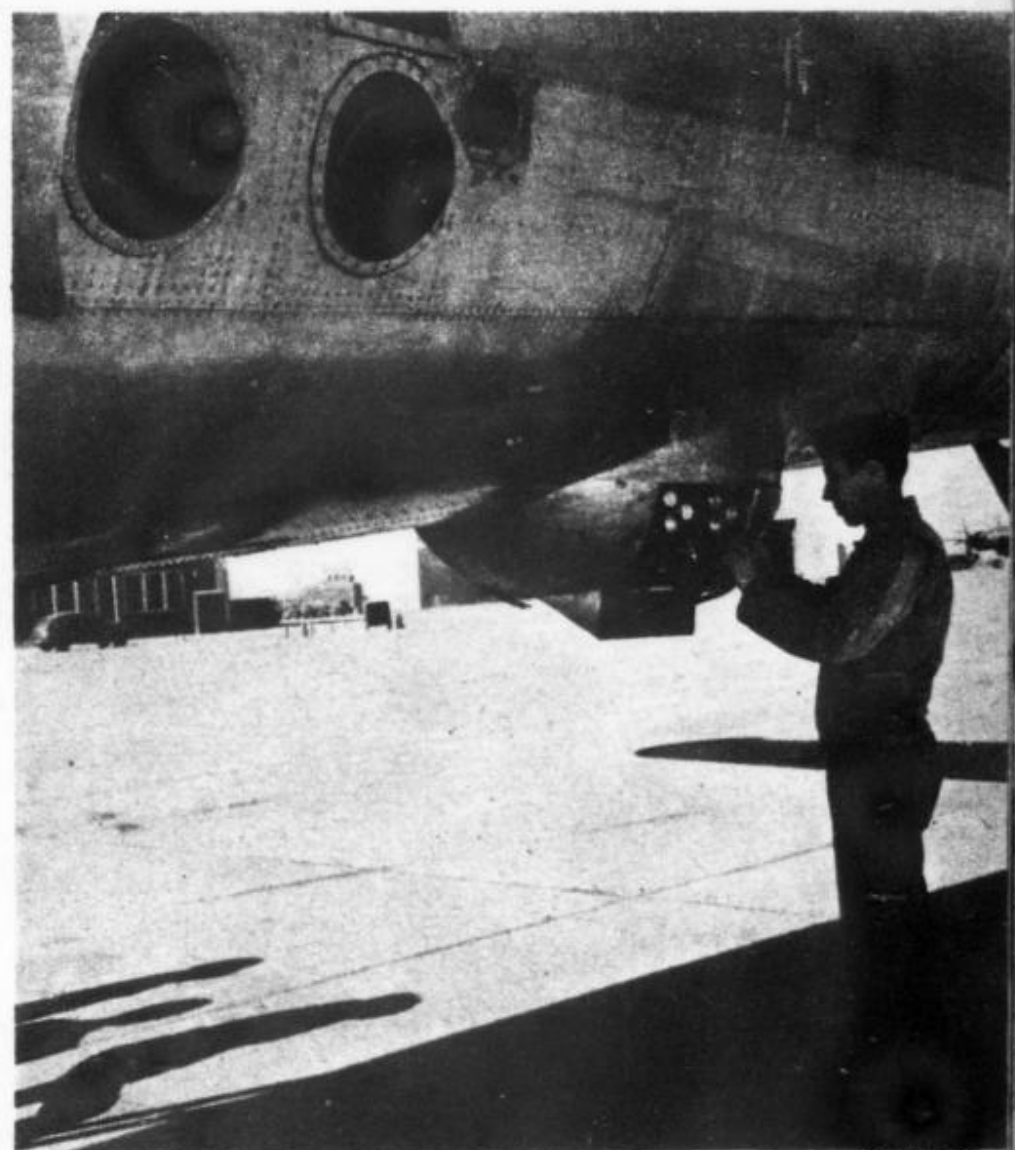
Within the atoll's perimeter is a sandy-bottomed lagoon of some 250 square miles over which the target fleet will be arrayed. The average depth of the lagoon is 100 to 180 feet, which permits easy salvage of any vessels sunk by the explosions.

The deployment of the observation vessels probably [Continued on page 153]

June, 1946



Checking the movie cameras in lower aft turret of a photo plane. Note large camera lenses in plane's side. Below, one of 20-inch lens cameras to be used.



See illustration on next page



A MUSTANG DRONES

B INSTRUMENT BUNKERS

C CAMERA TOWERS (see details on page 42)

D ROBOT B-17'S

E INSTRUMENTS DROPPING IN PARACHUTES

F B-29'S WITH 25 CAMERAS EACH

G MARINERS WITH GEIGER COUNTERS



MECHANIX ILLUSTRATED

A FAWCETT MAGAZINE

JANUARY
15^C



LATEST MUSTANG
Hits Speeds Over
425 Miles An Hour

SPECIAL FULL
COLOR SECTION

BATTLE OVER TELEVISION

SEE PAGE 67

BUILD A 1/2 H.P. GAS ENGINE ON YOUR LATHE

MECHANIX ILLUSTRATED

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JANUARY, 1945

VOL. XXXIII NO. 3

On the cover: Army Kodachrome of the P-51D

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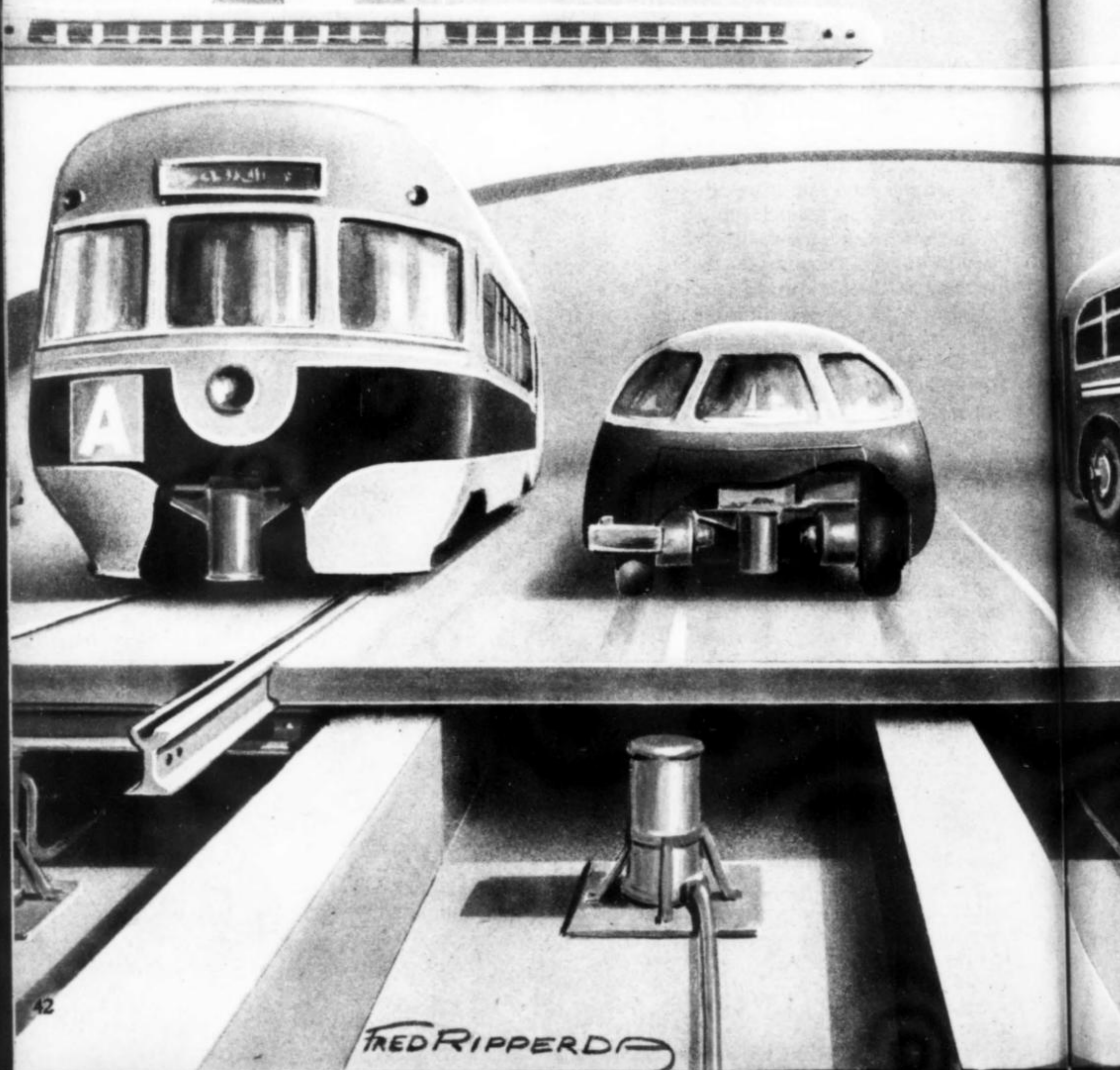
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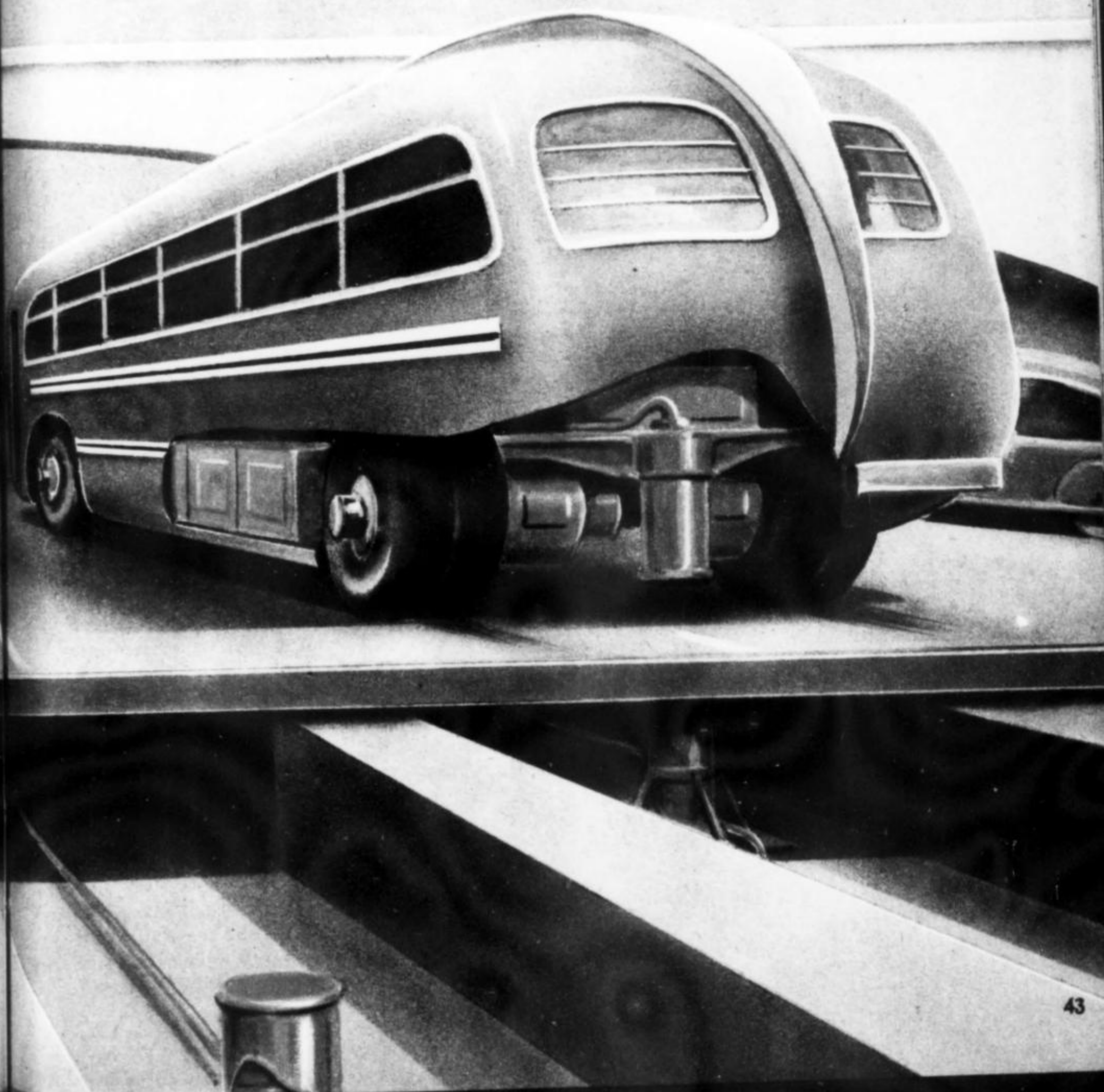
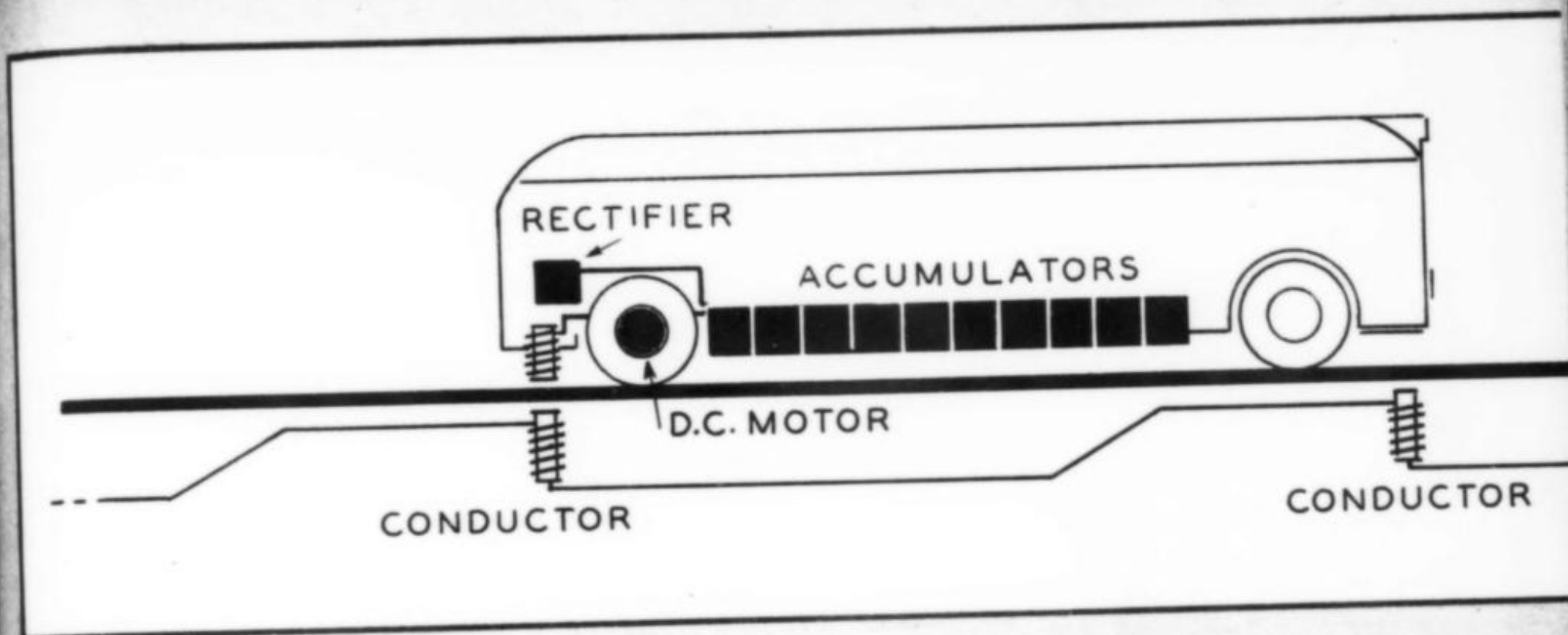
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BURIED POWER

FOR YOUR CAR

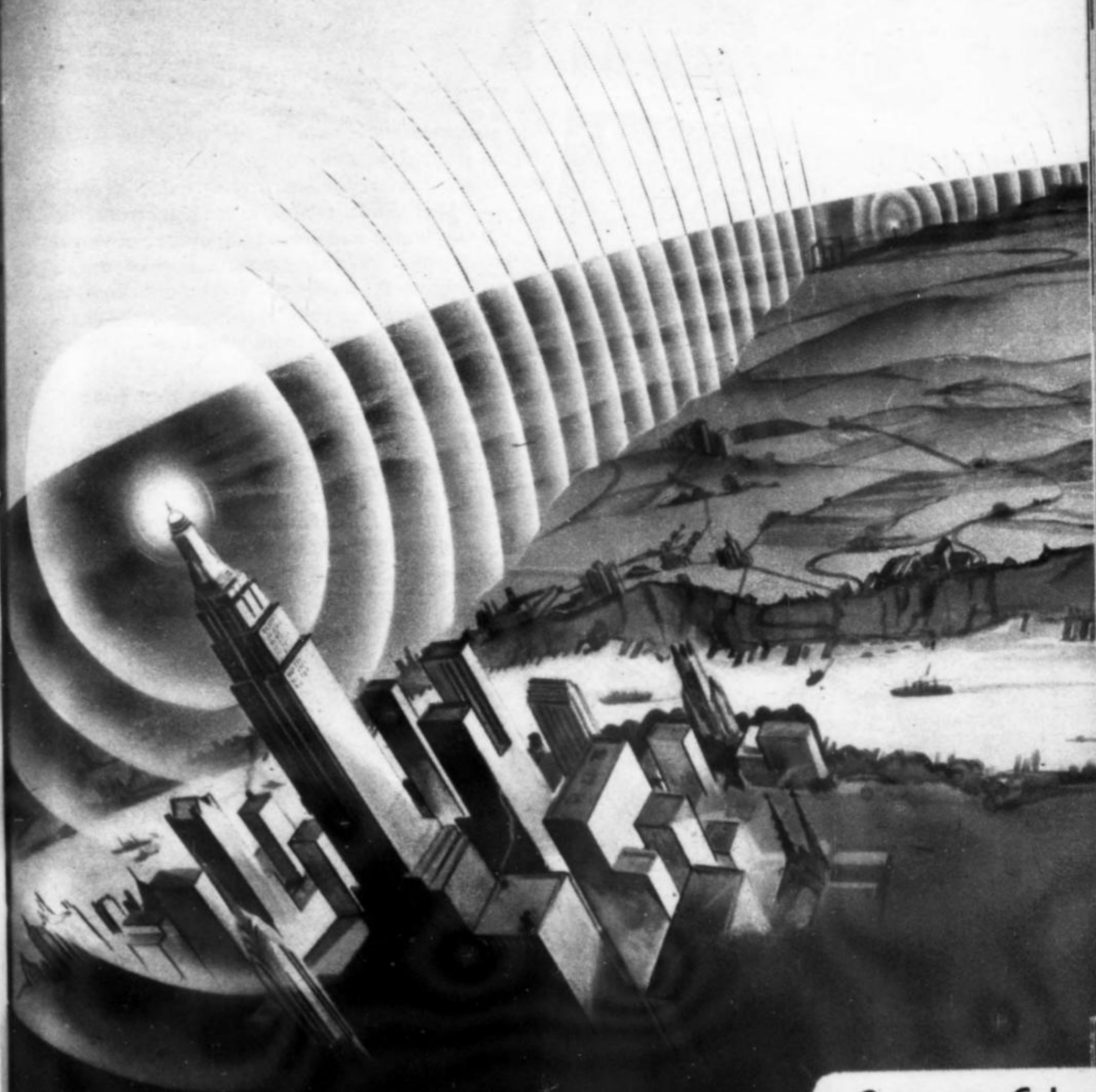
WILL the electric auto come back? A startling new Soviet device suggests the possibility of postwar busses, cars, and trolleys run by electrical power. Motive power comes from the high-frequency current in an electromagnetic field formed around conductors buried under the highway. The electric vehicle is equipped with a coil and accumulators to pick up and store the electric energy, passing it through a rectifier. These cars have been built and used in Russia.





TELEVISION

LONG EXPECTED, LONG DELAYED, RADIO'S
LUSTY OFFSPRING MAY REVOLUTIONIZE AMER-
ICA'S LIVING HABITS WHEN PEACE COMES



Science in Color

... A Word of Caution ABOUT POSTWAR TELEVISION

by J. H. Ream

*Vice President and Secretary (In Charge of Television),
Columbia Broadcasting System*

OUT of the laboratories of war-time electronic research comes the assurance that post-war television pictures can be vastly improved in quality. But with the assurance comes a warning that real improvement is possible only on much wider channels and at much higher frequencies than are now authorized as standard.

Because changed standards are necessary for its fulfillment, the promise of improvement has, in certain quarters, been received with little if any enthusiasm. Changed standards, in this case, mean instant obsolescence of all

existing equipment. Television, if it is to take advantage of the opportunity offered by war-time discoveries, will have to write off past investments and start again from scratch.

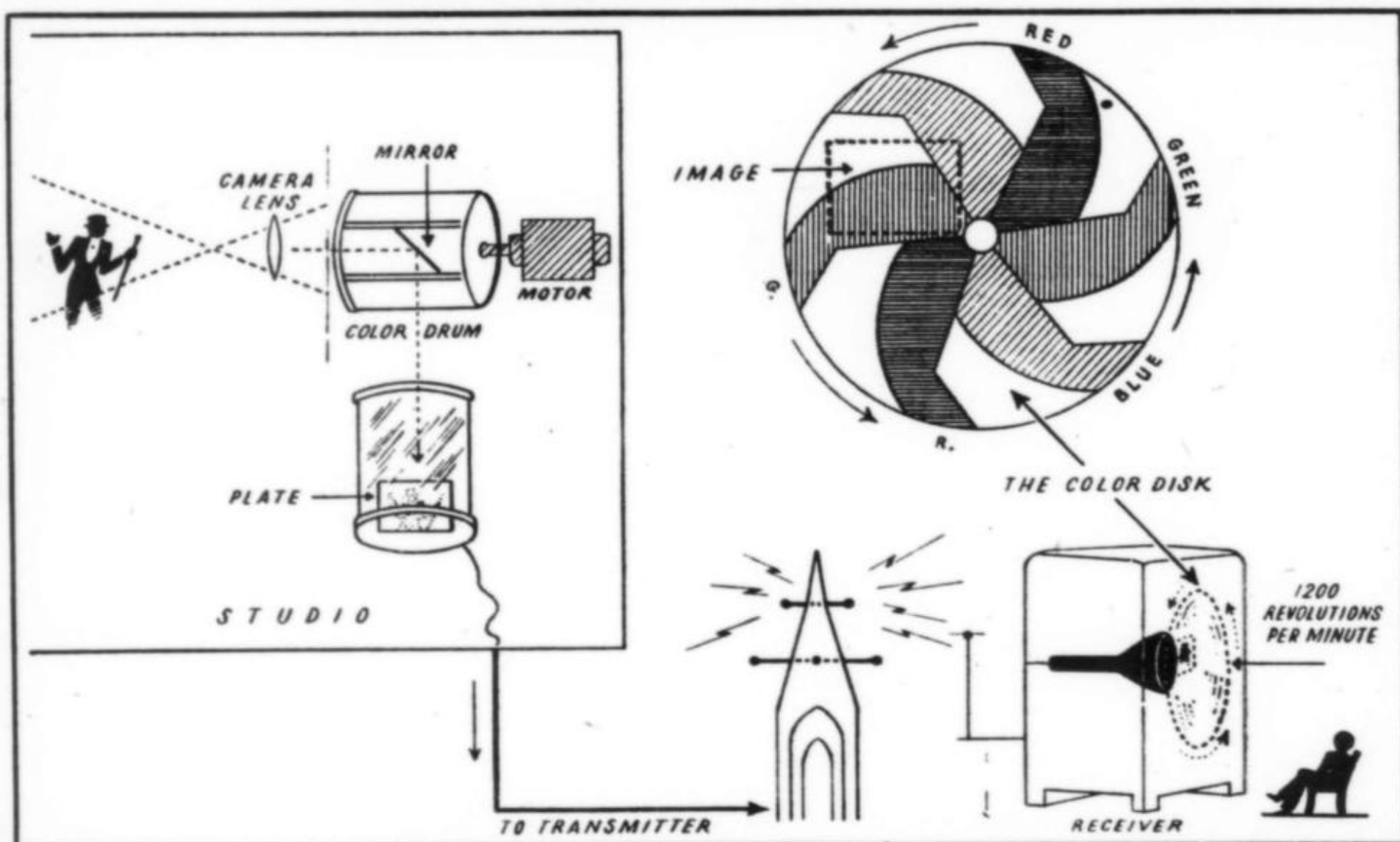
Believing that the American public is eager for television, manufacturers with sets designed on prewar standards are also eager to build and sell those sets as soon as they are permitted to do so. The Columbia Broadcasting System, among others, is of the opinion that this view, though understandable, is short-sighted.

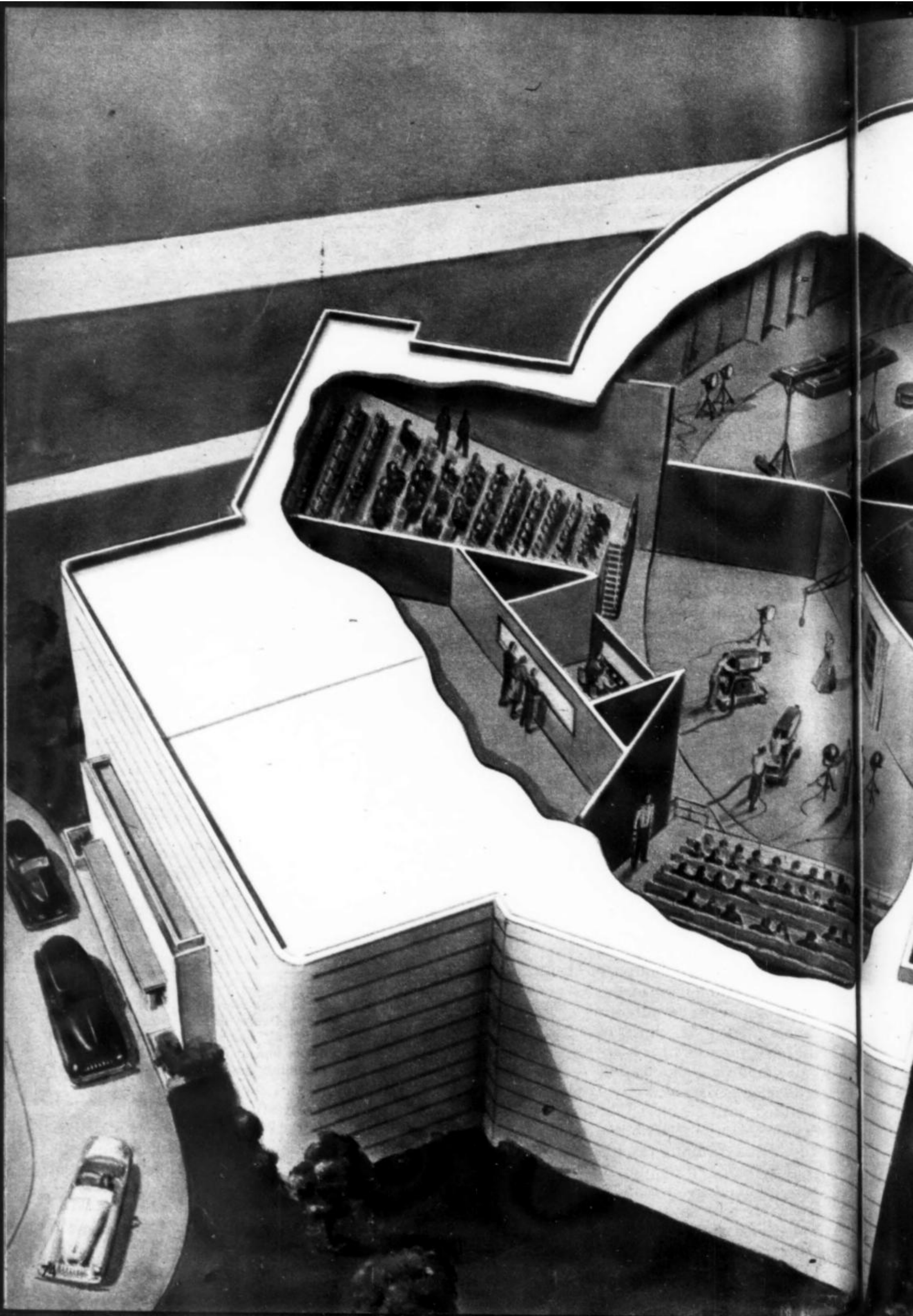
"The American public is eager for television."

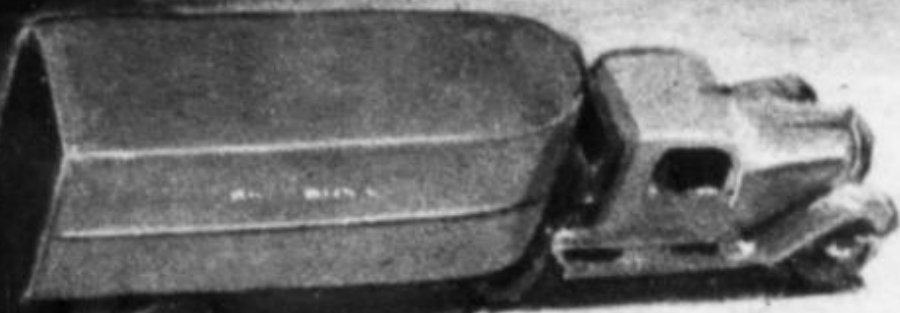
Without qualification, this statement is misleading if not meaningless. Certainly there is no public eagerness for small, indistinct and poorly lighted pictures. The sets that were available before the war sold at a speed that could scarcely be likened to "hot cakes." Public eagerness, if it exists, is based on visions and promises approaching perfection. If post-war television falls far short of public expecta-



COLOR TELECASTING: CBS has developed a color camera for television (see photo, left, and diagram below), argues that better color transmission will be made possible when a higher-frequency band in the radio spectrum is assigned to telecasters. The CBS camera breaks black-and-white image up into its color components by mechanical means, using colored filters mounted on a high-speed rotating drum. RCA, on the other hand, has developed a special camera tube for color work, insists that mechanical color systems are unsatisfactory and color dissection of images should be done electronically. With the CBS set-up, each primary color is transmitted separately to the receiver, which uses filters to build a color image.







TELEVISION STUDIO OF THE FUTURE will be completely functional. Design will be determined by studio layout and method of operation used, both of which are basically new. Studio shown here, designed by Austin Company for General Electric, features turntable stage, cantilevered television cameras, high-level illumination from water-cooled mercury-vapor lamps, and two audience seating areas.

FRED RIPPERD